BARR CREGG WIND FARM

Further Environmental Information (Oct 18)

Volumes 1 & 2

powering change

Contents

BARR CREGG WIND FARM
Further Environmental Information (Oct 18)

Volume 1 - Non-Technical Summary

Contents

Preface

This Further Environmental Information (October 2018) has been prepared in support of the planning application for the proposed Barr Cregg Wind Farm. The proposed wind farm is located in the townlands of Barr Cregg, Ballymaclanigan and Slaghtmanus, near Claudy in County Londonderry.

The FEI has been prepared by Renewable Energy Systems Limited (RES) in collaboration with the various specialists outlined below.

FEI Technical Support

Technical Specialism	Organisation
Bats	Blackstaff Ecology
Ornithology	David Steele

An electronic version of the FEI (October 2018) and other details about the project can be viewed at www.barrcregg-windfarm.co.uk.

Reference copies of the full ES (2012), FEI (2014), FEI (2016), FEI (2018), FEI (October 2018) and planning application(s) may be viewed and or purchased during normal opening hours at the following location

Diamond Centre

630 Baranailt Road

Claudy

County Londonderry

BT47 4EA

028 7133 8005

The FEI (October 2018) is available free of charge on CD or in paper form from the address above, or by contacting RES.

Renewable Energy Systems Ltd

Williowbank Business Park

Willowbank Road

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Larne

County Antrim

BT40 2SF

028 2844 0580

Context

Renewable Energy Systems hereafter referred to as 'RES', applied to DOE Planning Service for consent to construct a wind farm of seven wind turbines on land at Barr Cregg, approximately 4.5km north of Claudy and 9km south/southeast of Eglinton in the townland of Barr Cregg, County Londonderry. The planning application (Ref A/2012/0401/F) was submitted on 20th August 2012.

DOE Planning requested Further Environmental Information on 23rd October 2013 following consultation with statutory and non-statutory bodies. RES submitted FEI on 28th February 2014, which included 2 additional applications for an additional section of site access track and passing bays (A/2014/0112/F & A/2014/0114/F respectively). All consultation responses where received by Planning Service by January 2015. By April 2015, Planning Service had not reached a decision and all 3 planning applications (A/2012/0401/F, A/2014/0112/F & A/2014/0114/F) were passed to Derry & Strabane District Council as part of the Reform of Planning Administration.

In June 2015, Derry & Strabane DC Planning Department recommended that the main application for Barr Cregg Wind Farm (A/2012/0401/F &) be refused and following presentation to the planning committee on 1st July 2015, the application was refused and a decision notice issued on 21st July 2015. On 4th August 2015, Renewable Energy Systems Ltd submitted an appeal to the Planning Appeals Commission.

In October 2015 - Derry & Strabane DC Planning Department recommended that the planning applications for additional access track (A/2014/0112/F) and passing bays (A/2014/0114/F) be refused and was presented to the planning committee on 7th October 2015. On 6th November 2015, Renewable Energy Systems Ltd appealed the decision to the Planning Appeals Commission. A decision notice was issued on 28th November 2015.

In November 2016, an Informal Hearing was undertaken by the Planning Appeals Commission (PAC) and the RES UK & Irelands appeal was dismissed on 25th June 2017 on one very narrow ground relating to impact upon priority habitats.

Following a judicial review hearing at Belfast High Court on 24th January 2018, Keegan J concluded on the 21st February 2018 that "I have decided that this decision must be quashed and any reconsideration must be made in light of this judgement". She quashed all three decisions.

A re-hearing is due to be heard by the Planning Appeals Commission and this FEI (October 2018) has been prepared and submitted to take into account the upcoming hearing (date to be confirmed).

This document is a 'non-technical' summary of the Further Environmental Information (October 2018) with detailed information being presented in the FEI (October 2018), FEI (2018), FEI (2016), FEI (2014) and ES (2012).

Further Environmental Information

The purpose of this FEI is to update and complement, where appropriate, the environmental information previously submitted. The FEI (October 2018) together with the FEI (2018), FEI (2016), FEI (2014) and ES (2012) will comprise the environmental information before the Planning Appeals Commission.

This FEI (October 2018) is to be read in conjunction with the following documents and associated appendices:

- Environmental Statement (2012) except Socioeconomic Chapter which has been superceded by the Socioeconomic Chapter within FEI (2016);
- Further Environmental Information (2018), FEI (2016) and FEI (2014) which provides addenda to the full chapters included within the ES (2012);

The information contained in the Further Environmental Information (October 2018) - Volumes 1 – 2 has been produced to present addenda in relation to Bats and Birds to provide clarity for the Planning Appeals Commission.

Project Description

The proposal comprises the construction of seven turbines (each with an overall maximum height of 125 m above ground level) and associated infrastructure including a hardstanding pad at each turbine for crane erection, an upgraded site entrance, new and upgraded onsite access tracks, an onsite substation and control building, underground cables, two temporary monitoring masts, a temporary construction compound, a temporary enabling works compound and road widening and improvement works on sections of the transport route (road improvement works).

The Site Location and Alternative Infrastructure Layout (Figure E – RevB) are illustrated overleaf.

The Supplementary / Additional Assessments

<u>Bat Survey Report</u>

The bat surveys carried out prior to 2018 were regarded as still fit for purpose in the context of the redetermination of the planning appeal. However, it was decided to carry out additional check surveys during the late summer period of 2018 and this report describes the additional work which has been undertaken and summarises the environmental effects.

- Highest levels of bat activity (during walked surveys) were along the Burntollet River and associated riparian woodland to the north of the turbines (>500m).
- Low numbers of bat passes were recorded directly over the proposed turbine location during the automated static monitoring (for all species other than Leisler's bat; therefore, the collision risk of the proposed development on foraging and / or commuting bats (other than Leisler's bat) was assessed as not significant.

- However, moderate levels of activity were recorded for Leisler's bat (a high-risk species) at the proposed turbine locations for T3 & T6 (during the automated static monitoring sessions). Therefore, the collision risk on Leisler's bat was assessed as Moderate.
- For all other species, activity levels at the proposed turbine locations were significantly lower than at adjacent habitat features (i.e. stream corridors).
- A single bat roost was recorded during surveys. However, the roost was located 544m from the nearest turbine (T7) and is of a low-risk species (brown long-eared (n=12)). As a result, the proposed development was assessed as having a Low potential to impact upon roosting bats.

A precautionary BMMP (Bat Monitoring & Mitigation Plan), including carcass searches has been recommended. With this mitigation, the Development will not have a significant impact on local bat populations.

Ornithology Report

This updated report from that submitted in the FEI (2018) includes additional information in relation to Raptor Sightings that was gained during bird surveys in April to July 2018.

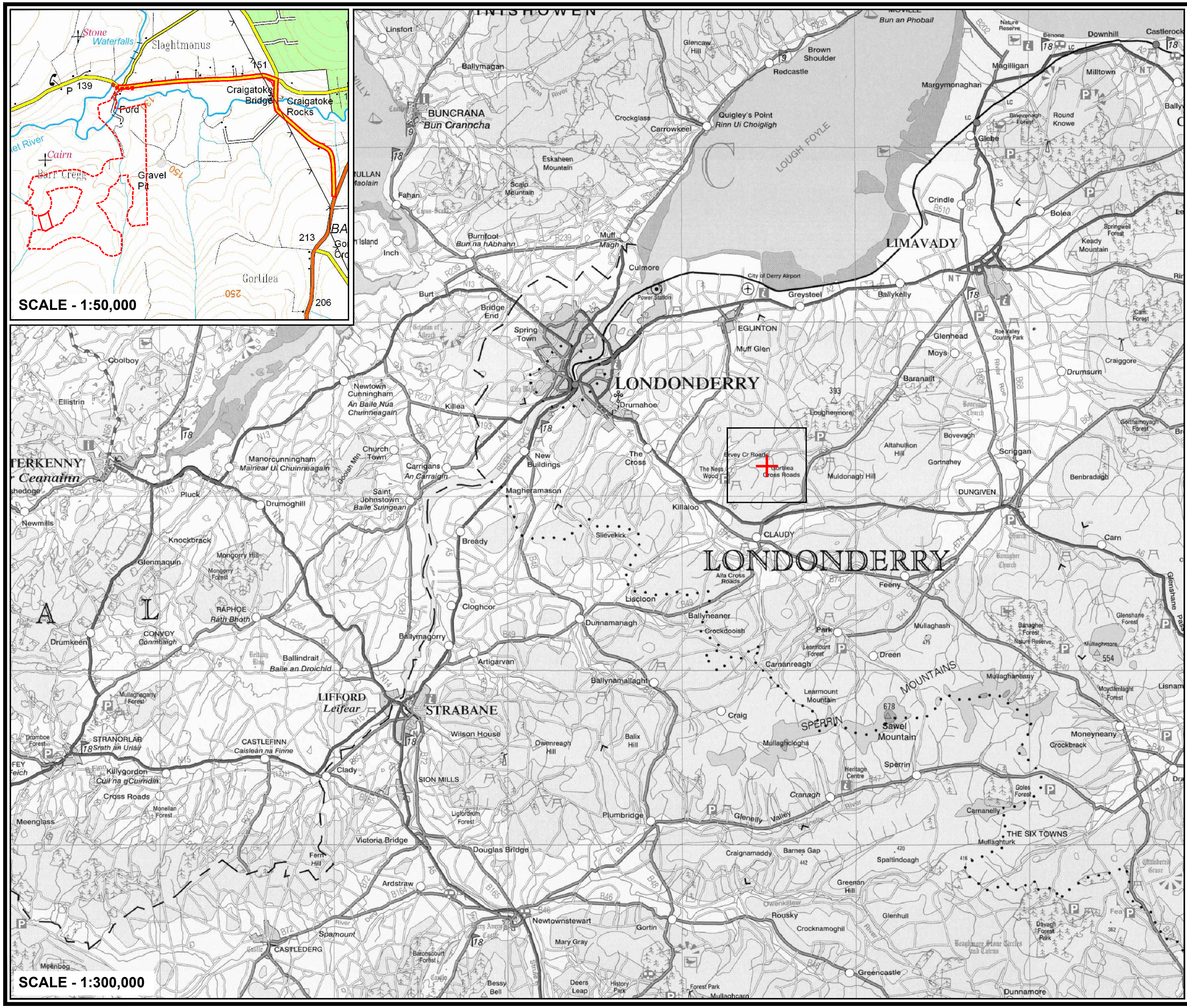
There has been no suggestion of any significant changes in raptor activity compared to that described by the ES 2012. Therefore, it is concluded that providing the proposed mitigation measures are implemented then there are no significant ornithological issues in relation to the proposal and the habitat management proposals are likely to deliver benefits (by way of improved habitat) for snipe and several other bird species of conservation concern (skylark, meadow pipit, stonechat and reed bunting).

Summary

The potential effects of the proposed Barr Cregg Wind Farm have been assessed in accordance with regulatory requirements and good practice. The ES (2012), FEI (2014), FEI (2016), FEI (2018) and FEI (October 2018) incorporate technical assessments of the proposed development based on requisite legislation and relevant planning policy framework and have demonstrated that significant environmental effects associated with the construction, operation and decommissioning of the proposed wind farm have been avoided or minimised through the use of the iterative design process and with the application of mitigation measures.

The Barr Cregg Wind Farm will provide a number of benefits. The scheme will result in a reduction in greenhouse gas emissions from the electricity generating industry by harnessing wind as an alternative to the burning of fossil fuels, in line with the local government's energy goals and wider UK energy targets.

Paragraph 5.72 of SPPS states “Planning authorities should be guided by the principle that sustainable development should be permitted, having regard to the local development plan and all other material considerations, unless the proposed development will cause demonstrable harm to interests of acknowledged importance”. RES are firmly of the opinion that the Barr Cregg Wind Farm is a suitable location for a wind farm development and that the ES (2012), FEI (2014), FEI (2016), FEI (2018) and FEI (October 2018) demonstrate that to be the case



BARR CREGG WIND FARM

FIGURE A

SITE LOCATION MAP

KEY:

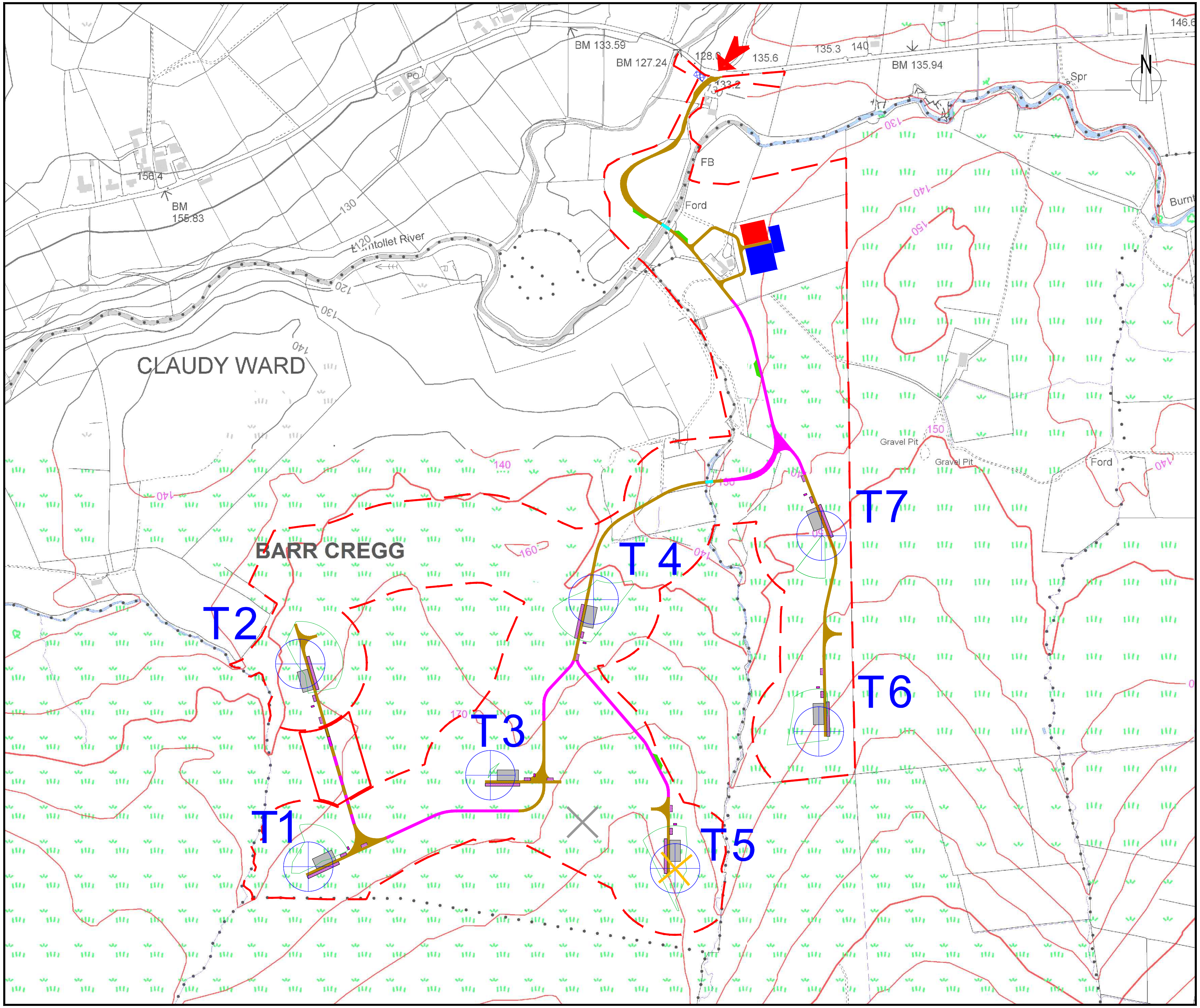
- PLANNING APPLICATION BOUNDARY (PLANNING REFERENCE A/2012/0401/F) (dashed line)
- PLANNING APPLICATION BOUNDARY (solid line)
- SITE CENTRE

LAYOUT DWG	N/A	T-LAYOUT NO.	N/A

DRAWING NUMBER: 02381D221□-04

SCALE - AS SHOWN @ A4

NON-TECHNICAL SUMMARY



BARR CREGG WIND FARM

FIGURE E - REVISION B

ALTERNATIVE INFRASTRUCTURE LAYOUT

Key

- Wind Turbine Location
- Micrositing Buffer (80m)
- Planning Application Boundary
- Planning Application Boundary (Planning Reference A/2014/0114/F)
- Site Tracks (New Excavated)
- Site Tracks (New Floated)
- Site Tracks (New Excavated on Floated)
- Control Building & Substation Compound
- Clear Span Watercourse Crossing
- Crane Hard Standing Area
  - Permanent
  - Temporary
- Temporary Passing Places & Turning Heads
- Temporary Construction Compound
- Temporary Enabling Works Compound
- Meteorological Calibration Reference Mast Location
- Meteorological Calibration Mast Location
- Site Entrance Location

LAYOUT DWG	02381D0001-12	T-LAYOUT NO.	PNIRBRC034

DRAWING NUMBER **02381D1004-07**

SCALE - 1:10,000 @ A4

FEI 2018

BARR CREGG WIND FARM

Further Environmental Information (Oct 18)

Volume 2 - Bat & Bird Reports

Contents

Bat Survey Report

Bat Survey Report for Barr Cregg Windfarm

For: res

006/2018-01

October 2018

Ecological Assessment | Ecological Clerk of Works | Bat Surveys | Badger Surveys
Biodiversity Checklists | Ornithological Assessment | Preliminary Ecological Appraisal

Blackstaff Ecology

Document history

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A	12/10/2018	First Issue
B	15/10/2018	Second Issue
C	19/10/2018	Final Issue

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Contents

Executive Summary

This is a brief summary of survey results. For full details please read the report in its entirety.

- Highest levels of bat activity (during transect surveys) were along the Burntollet River and associated riparian woodland to the north of the turbines (>500m).

- Low numbers of bat passes were recorded directly over the proposed turbine location during the automated static monitoring (for all species other than Leisler's bat; therefore, the collision risk of the proposed development on foraging and / or commuting bats (other than Leisler's bat) was assessed as **not significant**.

- However, moderate levels of activity were recorded for Leisler's bat (a high-risk species) at the proposed turbine locations for **T3 & T6** (during the automated static monitoring sessions). Therefore, the collision risk on Leisler's bat was assessed as **Moderate.**

- For all other species, activity levels at the proposed turbine locations were **significantly lower** than at adjacent habitat features (i.e. stream corridors).

- A single bat roost was recorded during surveys. However, the roost was located 544m from the nearest turbine (T7) and is of a low-risk species (brown long-eared (n=12)). As a result, the proposed development was assessed as having a **Low** potential to impact upon roosting bats.

  A precautionary BMMP (Bat Monitoring & Mitigation Plan), including carcass searches has been recommended. With this mitigation, the Development will **not have a significant impact** on local bat populations.

Introduction

1. Blackstaff Ecology Ltd. was commissioned by RES UK & Ireland Ltd to assess bat activity at lands situated 400m south of the Slaughtmanus Road, in the townland of Barr Cregg.

2. The site was identified as being of low risk (see Table 4.4, Chapter 10 BCT Good Practice Guidelines (2012)) due to the presence of largely low-quality foraging habitat for bats (blanket bog and upland heath) across the majority of the site with some areas of moderate quality foraging habitat (stream valleys/ hedges) which are located around the periphery of the site (to the north, east and west).

3. The bat surveys carried out prior to 2018 were regarded as still fit for purpose in the context of the redetermination of the planning appeal. However, it was decided to carry out additional check surveys during the late summer and autumn period of 2018. The required three crepuscular bat surveys were conducted, albeit in a relatively condensed timeframe (i.e between mid-August and mid-October 2018). It should be noted that bat activity (and associated impacts) at wind turbine installations are more frequent during late summer and autumn. Therefore, the current spread of survey data is considered sufficient in order to allow NIEA NED to complete an updated assessment on the potential impacts from the proposed Development on the local bat population.

4. In addition to the three transects, an average of 15 nights of automated monitoring was also carried out (at the proposed turbine locations). 15 nights is equivalent of three rounds of five nights (spring, summer & autumn) as required by the BCT (2012) guidance for a low-risk site such as Barr Cregg. The automated monitoring involves the placement of 'paired' detectors (one at each turbine location and a second at the nearest habitat feature (i.e. stream/hedgerow)). Bat activity levels between the various locations can then be compared in order to build up a picture of the levels of activity within the site.

5. Hand-held bat detectors were used to record bat activity during the crepuscular surveys, with static bat detectors also deployed to provide additional data on bat activity. All detectors used/methods of recording allow for the identification of all species of bat and store the information for later analysis (as required by the NIEA guidance[1]).

Statement of Authority

6. This report was prepared and work undertaken by Mr Cormac Loughran (MSc CEnv MCIEEM), Director of Blackstaff Ecology Ltd. Two of the 2018 transect surveys were also undertaken by Justin Judge, Ecologist.

7. Cormac is a Chartered Environmentalist (CEnv), and a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). He holds an MSc (Distinction) in Environmental Management from the University of Ulster, and has extensive experience in bat surveys; having undertaken and coordinated full bat surveys and associated impact assessments for 21 major wind farm developments, and 15 single turbines.

8. Cormac has also previously held a Natural England Disturbance Licence (20121610)

[1] https://www.daera-ni.gov.uk/sites/default/files/publications/daera/bat-survey-specifications.pdf

for Bats (all species, (all counties of England)). He has attended numerous courses and conferences, specifically relating to bats, for the purposes of CPD (Continuing Professional Development). These have included the Natural England approved 'Bat Licence Training Course' run by Wildwood Ecology (Cardiff). Cormac has also attended the BCT (Bat Conservation Trust) approved course 'Bats and Trees', and has attended three BCI (Bat Conservation Ireland) biannual conferences (2010 Kilkenny, 2012 Sligo & Cork 2014). He also attended the Nathusius' Pipistrelle Workshop in Enniskillen (2009).

9. Justin Judge has over six years' experience within the ecology and nature conservation sector and has worked with a range of both terrestrial and marine faunal species through laboratory research, wildlife rehabilitation and wildlife surveys. He has experience working on large conservation projects for protected species, funded by the European Union (LIFE 14, INTEREG IVA) and UK bodies (Heritage Lottery Fund, NIEA), through positions with Queen's University Belfast and various other organisations. In terms of bat work, Justin has completed bat surveys for windfarms, single turbines, road projects and buildings through both Blackstaff Ecology and Hopkirk & Russ Bat Ecology.

Legislation

10. All bat species found in Northern Ireland are listed under Appendix III of the Bern Convention and Annex IV of the EC Habitats Directive. In addition, bats and their habitats are listed under Appendix II of the Bonn Convention; therefore, there is an obligation to protect the habitat of bats, including links to important feeding areas. Bats also receive protection under Schedule 2 of the Conservation (Natural Habitats) Regulations (NI) 1995, as amended.

11. In relation to the above European Protected Species, it is an offence if:

- *They are deliberately captured, injured or killed*
- *These animals are disturbed in such a way as to significantly affect their ability to survive, breed, or rear / nurture their young, or in a way that affects the local distribution or abundance of that species*
- *A breeding site or resting place of these species is damaged or destroyed, even if this is unintentional and / or when the animal is not present*
- *Access to a structure or place used by these species for protection or shelter is intentionally or recklessly obstructed*
- *This legislation applies to all life stages of these species*

12. Also note that a licence may be required from the Northern Ireland Environment Agency for development work which is likely to affect a bat roost.

13. In addition to the above legislation, local planning authorities are also required to take into consideration natural heritage (including protected species and habitats) when a proposed planning application is being considered; the criteria used for this purpose are detailed in the guidance document 'Planning Policy Statement 2 (PPS2) – Natural Heritage'. The local planning authority should also consult with the Northern Ireland Environment Agency regarding protected species and / or habitats which may be present within the application area.

Bats & Wind Turbines

14. There is evidence from the USA and mainland Europe to suggest that single wind turbines can impact upon bats as dead bats have been found beneath some turbines. Such deaths may have been caused either by direct collision with the

turbine blades, or caused by damage to the bat's lungs as they pass close to the rotating turbine blades.

15. Such damage is called 'pulmonary barotrauma' and is thought to occur as bats fly into areas of low air pressure which are created as the turbine blades are rotating; the resulting sudden change in air pressure is thought to cause the bat's lungs to expand at a rate which causes soft tissues within the lungs to rupture.

16. A European Union Advisory Committee called EUROBATs (which was initiated in 1994 and is concerned with the conservation of European bat populations) has produced guidance on how any potential impacts of wind turbines on bats can be assessed.

17. The guidance, 'EUROBATS Publication Series No. 3: Guidelines for consideration of bats in windfarm projects (2008)' identifies a need to conduct pre-construction bat activity surveys as well as assessing any habitat feature(s) which may be used by bats within the local landscape. Such a survey should particularly aim to identify situations which would pose a high level of risk to bats e.g. active bat roost, commuting corridor or foraging habitat in close proximity to a proposed turbine location.

18. Various bat species are at varying degrees of risk from wind turbines as each species has a different flight style, foraging method and echolocation call. Using these parameters, it has been determined that two Irish bat species are at a high level of risk from turbines (at a population level)[2] Leisler's bat and Nathusius' Pipistrelle; the remaining six Irish bat species were all regarded as being at a low level of risk from turbines (at a population level).

Bat Call Analysis

19. Analysis of recordings from the Batlogger M which was used during the first two activity transects was carried out using BatExplorer software. Analysis of recordings from the EchoMeter Touchpro which was used during the third manual activity survey and analysis was carried out using Kaleidoscope Pro software.

20. Kaleidoscope Pro was used to undertake analysis of data collected during automated passive monitoring, although noise files were also manually checked using AnalookW in order to double check the bat classifiers were accurate. Bat activity was measured using the number of files containing a bat call or bat call sequence irrespective of length, for a complete night of recording. This method of passive monitoring enables determination of species composition, temporal activity patterns (between different times of year and different times of night) at a fixed location.

21. All detectors used during surveys are broadband detectors however, the frequencies of ultrasonic calls (from the static detectors) were divided by a factor of 8 and the data produced were then viewed as ZC (zero-crossed) files.

22. All the various software programmes used represent the recorded calls as sonograms (graphs of call frequency along the Y axis against time (duration) of the call along the X axis). All sonograms were then analysed to determine bat species. Echolocation calls are reliably distinguishable from other sounds (e.g. wind, mechanical sounds, birds or insects), but the ability to distinguish species of bats varies with taxon, location, type of equipment & quality of recording, and can be difficult. Some bats are relatively easy to speciate from viewing sonograms and very little additional analysis of the sonograms may be required. Some species, such as

[2] Natural England Technical Information Note TIN051 Bats and onshore wind turbines Interim guidance. Third edition 11 March 2014.

those within the genus Myotis, can be extremely difficult, if not impossible to separate into species.

23. Bat echolocation calls consist of repetitive patterns commonly referred to as pulses or calls. Here, a singularly produced sound is defined as a pulse and the consecutive repetition (sequence) of pulses is defined as a call. Calls which were difficult to identify from viewing the sonogram alone were analysed in more detail by determining the mathematical parameters of the pulses that could be defined. Any noise distorting the clear definition of a pulse was excluded from analysis. The mathematical parameters measured included:

- Time between each pulse known as Inter Pulse Interval (IPI);
- Duration of call (Dur);
- Maximum frequency of call (Fmax);
- Minimum frequency of call (Fmin); and,
- Peak frequency of the call (Fpeak).

24. There are inherent limitations when surveying bats using ultrasonic detectors. Ultrasound, unlike audible sound, is attenuated rapidly in air. Many echolocation calls are in the 40KHz to 60KHz region, where air attenuation is over 1dB per metre. Sound absorption increases exponentially with frequency and a bat echolocating at 30kHz is unlikely to have a range exceeding 30m, with the range decreasing to 10m at 100KHz. Some bats call louder than others, notably Leisler’s bat, which calls at the lowest frequency of any Irish at <25KHz where excess attenuation is around 0.5 dB per metre. It is frequently audible at around 80m (Altringham, 2003).

25. In practice this means that bat detectors do not detect most bats calling from 30kHZ and upwards at distances over 30m[3]. Some species, such as brown long-eared bat, make very directional and quiet calls and can only easily be detected when the detector is facing the source of call (i.e. the bat) and at close range.

26. Therefore, there may be some bias in the recording of bat species, caused by variations in the detectability of different species. The potential for some species of bats to be overlooked has been reduced as much as possible by the use of a variety of broadband (full-spectrum & frequency division) bat detectors (and with the use of headphones to cut down on background noise experienced by the surveyors), static recording, subsequent analysis of recordings and by the use of point counts (listening stops) during transects, where the surveyors are standing still, which reduces background noise on the detectors caused by surveyor movement. The manual surveys also used a combination of electronic detectors and observing bat behaviour where possible; the behaviour and size of bats can be used in combination with the calls to indicate species.

27. Table 1 indicates the maximum distances of ultrasonic detection for bat species occurring in the UK. The data has been taken from Eurobats and was collated based on a literature review and on the experience of Eurobat Intercessional Working Group members. It should be noted that this data is from surveys carried out on the continent and using a Pettersson Elektronik D980 bat detector.

Table 1 - Distances of ultrasonic detection for bats occurring in Northern Ireland[4]

[3] John D. Altrincham (2003) British Bats

[4] Information taken from Rodrigues, L., L. Bach, M.J. Dubourg-Savage, J. Goodwin & C. Harbusch (2008): *Guidelines for consideration of bats in wind farm projects.* EUROBATS Publication Series No. 3 (English version). UNEP/EUROBATS Secretariat, Bonn, Germany, 51 pp. (Table 2, pp 48-49)

Species	Forages close to habitat structure	High Flight (>40 m high)	Low Flight (i.e. almost ground level)	Maximum distance of ultrasonic detection (m)
Common pipistrelle	Yes	Yes	Yes	30
Soprano pipistrelle	Yes	Yes	Yes	30
Nathusius' pipistrelle	Yes	Yes	Yes	30-40
Brown long-eared	Yes	Yes	Yes	30
Daubenton's bat	Yes	Yes	Yes	30
Natterers' bat	Yes		Yes	20
Whiskered bat	Yes		Yes	15
Leisler's bat		Yes		60-80

28. Data from automated/static systems is limited because there is no observational context. Fifty bat passes could represent one bat passing 50 times (i.e. while foraging along a riparian corridor) or 50 bats each passing once (i.e. when commuting between a roost and a favoured foraging location. Reality is likely to be somewhere between these two extremes.

29. Therefore, the ability to estimate abundance of bats by carrying out detector surveys is limited as it requires differentiation between multiple passes of a single bat and multiple bats making single passes, and is not usually possible through echolocation monitoring. However, the results can be used to indicate relative activity of bats in different habitats based on number of bat passes over time.

30. There are also some limitations on identification of some bats to species level, particularly those of the genera Myotis. This is due to similarities in calls of the different species and they can be difficult to identify to species level in cases where the bat pass was; brief, distant, faint or if the bat was not seen. Due to the similarities in call parameters, species of the genera Myotis can often not be identified to species level using analysis of recorded bat calls.

31. The methods used have referred to best practice guidance available at the time of the surveys and used a range of survey methods on a number of visits to increase the chances of encountering bats. Bat activity surveys and static recording has been carried out within the active season (May – September), including within the periods of key bat activity at upland windfarm sites (late-summer/early–autumn), and have covered all of the proposed turbine locations and key habitats close by. The data collected is therefore suitable for evaluation and impact assessment in relation to the proposed development.

Evaluation

32. Although the CIEEM (2018) Guidelines on Ecological Impact Assessment in the UK provide general guidance for evaluating the nature conservation value of habitats, it is extremely difficult to evaluate the value of species; species and the habitats that support them are generally considered together.

33. For the purpose of this project the guidance Valuing Bats in Ecological Impact Assessment (CIEEM, 2010)[5] has been considered. This guidance is based upon the rarity of bat species (see Table 2). The limitations involved in this evaluation method are largely related to the limited data available on bat populations in Britain and Ireland.

Table 2 - Categories of bat rarity in Northern Ireland (adapted from CIEEM, 2010)

[5] Wray S, Wells D, Long E, Mitchell-Jones T (December 2010) Valuing Bats in Ecological Impact Assessment, IEEM In-Practice p 23-25

Rarity within Range	Northern Ireland
Rarest (population under 10,000)	whiskered
Rarer (population 10,000 to 100,000)	Daubenton's Natterer's Leisler's Nathusius' pipistrelle brown long-eared
Common (population over 100,000)	common pipistrelle soprano pipistrelle

Species Present and Conservation Status

34. Bat species recorded during the surveys (in order of abundance from most abundantly recorded to least recorded) together with details of the species' conservation status are given in Table 3.

35. The potential presence of a number of species of the genera Myotis was identified but could not be identified with certainty to species level. However, analysis of the recordings suggested that whiskered/ Natterer's bats were present. Table 3 below includes the Myotis species that could be within the geographic area.

36. Along with the information received from the data search, the following references were used for information on the national and local status of bat populations:
    - Bat Conservation Trust, 2000: Distribution Atlas of Bats in Britain and Ireland;
    - The National Bat Monitoring Programme. Annual Report 2010. Bat Conservation Trust, London. (http://www.bats.org.uk/pages/national_bat_monitoring_programme_annual_report_2010.html);
    - UK Biodiversity Action Plan (http://jncc.defra.gov.uk/default.aspx?page=5155);
    - Harris S., Morris, P., Wray, S. & Yalden, D. (1995) A review of British mammals: population estimates and conservation status of British mammals other than cetaceans. JNCC, Peterborough; and
    - Harris, S. and Yalden, D. (2008) Mammals of the British Isles Handbook, 4th Edition. The Mammal Society.

37. All UK bats are listed under the following European Community Directives, Conventions or UK legislation:
    - Appendix II of the Bern Convention. An agreement on the Conservation of Bats in Europe (EUROBATS) under the auspices of the Bonn Convention, also known as the Convention on Migratory Species (CMS) is in force, and all European bats are listed under Appendix II of the CMS;
    - Appendix II of the Bonn Convention (and Recommendation 36 on the Conservation of Underground Habitats),
    - Annexes II and IV of the EC Habitats Directive; and
    - The Conservation (Natural Habitats etc.) Regulations (Northern Ireland) 1995 (as amended).

38. All of the bat species listed in Table 3 below have been recorded commuting and/or foraging within habitats in the application site. The population of each of the bat species listed in Table 3 within NI are unknown; however, estimates of the NI population trends have been derived from Car-based Bat Monitoring Scheme undertaken (since 2003) by BCI (Bat Conservation Ireland) and part-funded by

NIEA.

Table 3 - Bat species recorded within the survey area and their conservation status

Bat Species	Species Action Plan (SAP) Status	NI Population Trend	Estimated Population size, rarity and distribution
Common pipistrelle	All Ireland SAP LBAP	Increasing	Results from this scheme indicate that since 2003 the soprano pipistrelle has increased significantly while the common pipistrelle has also increased, albeit more slowly. The reasons for these increases are poorly understood but both species may be recovering from past declines, or responding to increased woodland cover and/or climate change.
Leisler's	All Ireland SAP LBAP	Increasing	Leisler's bat is monitored by the Car-based Bat Monitoring Scheme and its annual trend has shown significant increases since 2003. The reasons for the increase is poorly understood but it may be recovering from past declines, or responding to increased woodland cover and/or climate change.
Soprano pipistrelle	All Ireland SAP UK SAP LBAP	Increasing	Results from this scheme indicate that since 2003 the soprano pipistrelle has increased significantly while the common pipistrelle has also increased, albeit more slowly. The reasons for these increases are poorly understood but both species may be recovering from past declines, or responding to increased woodland cover and/or climate change.
Other bats that could be present within the Myotis spp.			
Natterer's bat	All Ireland SAP LBAP	No trend data available	One of the rarer Irish bat species, the Natterer's bat likes woodland, mature hedgerow and pasture habitats.
Daubenton's bat	All Ireland SAP LBAP	No trend data available	The Daubenton's bat annual trend is monitored using a volunteer-based programme – the All Ireland Daubenton's Bat Waterways Survey. This scheme has been ongoing since 2006 and the Daubenton's bat trend has been reasonably stable since this time.
Whiskered bat	All Ireland SAP LBAP	No trend data available	Another uncommon and little-known bat, the whiskered is closely related to the Natterer's, Daubenton's and Brandt's bats. The whiskered bat typically forages along forest tracks or near water. It has a rapid fluttering flight and flies along a regular 'beat' over and over again. It is sometimes found roosting in attics of old buildings but there are very few confirmed roosts in Ireland.
Nathusius pipistrelle	All Ireland SAP LBAP	No trend data available	The species is recorded by the Car-based Bat Monitoring Scheme, although in such low numbers that its annual population trend is difficult to establish with certainty.
Brown long-eared bat	UK BAP	No trend data available	A scheme for monitoring the brown long-eared bat at its roosts was developed in 2007 (the Brown Long-eared Bat Roost Monitoring Scheme). Thus far its population has been stable.

Table 4 - Nature conservation importance of individual bat species present within the survey area

Species	Relative population size and status[6]	Background
Common pipistrelle	Common	This species is common and widely distributed across NI and uses a range of habitats including urban and industrial areas. No roosts are present within survey area, although roosts are known within 5km. This is the most frequently recorded species within the 5km desk study search area and was the most frequently registered bat species during both the manual and static bat surveys. The population using the site is unlikely to be of importance at the county level (i.e. medium importance) given their widespread distribution.
Soprano pipistrelle	Common	This species is common and widely distributed across NI. No roosts are present within survey area. The population using the site is unlikely to be of importance at the county level (i.e. medium importance) given their widespread distribution.
Leisler’s	Scarce	This is a rarer bat species in Britain but is more common in NI. Present bat population in the county unknown. No roosts are present within the survey area. However, Leisler's bats in Ireland were found to commute to their feeding sites at speeds of up to 40 km/h at a distance of up to 13.4km (Shiel et al., 1999).
Myotis	Common/fairly common/locally distributed (depending on species)	These rarer species are widespread across the UK but in low numbers (the low numbers of these species could be due to a lack of recording effort rather than them not being present). Present bat population in the county is unknown. No roosts are present within the survey area for these species and there are no records of these species within 5 km of the application site.
Nathusius pipistrelle	Rare	This species is uncommon and localised within NI. Anecdotally it is mostly found near large water bodies such as Lough Neagh and Upper Lough Erne. No roosts are present within the survey area. The population in the area is likely to be small and this species was recorded infrequently during the surveys for Barr Cregg.
Brown long-eared bat	Common	Brown long-eared bats are common throughout Northern Ireland, and it is our third most commonly recorded species with just over 200 records to-date. Even so, as roost sizes are quite small and many of the records are of single bats, the overall number of individuals is not high. A new roost was recorded during surveys at a distance of 544m from the nearest turbine.

Methodology

39. Survey methodology followed guidance in Table 10.2 of the 2012 BCT Guidelines for ‘Low-risk’ sites, but also took cognisance of the Bat Conservation Trust Bat Surveys: Good Practice Guidelines’ (2016); the Northern Ireland Environment Agency also recommends consultation with this publication with reference to any bat surveys carried out within Northern Ireland.

Desk Study

40. Bat surveys (including; Pre-Survey Site Visit, Manual & Driven Bat Activity Surveys transects and Automated Passive Monitoring) were conducted between April and September 2011 as part of the original planning application as per NIEA NH recommendations in force at that time.

[6] Based on Battersby, J (Ed) & Tracking Mammals Partnership (2005).

Bat Records

41. Consultation with the NIBG (Northern Ireland Bat Group) was undertaken in order to obtain records for roosts within 10 km of the site. Records were also obtained from the Biodiversity Maps website as this contains some All-Ireland records (i.e. Daubenton's Bat Waterway Survey (which is managed by Bat Conservation Ireland).

Pre-Survey Site Visit

42. A daytime inspection of trees and structures within 200m of the developable area[7] was undertaken for evidence of roosting bats and to make a general assessment of potential roosting features within the survey area to identify structures or trees which could potentially be used by bats. Ordinance Survey mapping and aerial photographs were also used to aid in the identification of potential features prior to the site visit.

43. Both direct and indirect methods were employed in order to search for evidence of bats. Direct methods involve surveying for observations of bats or the remains of dead bats. Indirect methods involve identification of faecal pellets, urine, oil stains and feeding remains, which indicate evidence of bat activity. It should be noted however that bats often leave little evidence of their presence.

Activity Transects

2014

44. Transects were carried out at T3 & T4 and the adjacent drain during 2014 as part of precautionary check surveys. These were carried out on three occasions across the entire bat activity season between May and September. Details of the three transect visits are listed in Table 5 below.

Table 5 - Bat Activity Survey dates

Survey Type	Date of survey	Air Temp °C	Time of survey
Dusk survey	15th May 2014	11	2103 – 2333
Dusk survey	29th July 2014	14	2110 – 2340
Dusk survey	3rd September 2014	17	1955 - 2225

45. During the 2014 transects the surveyor walked repeatedly up and down either side of the central drain, stopping frequently (to listen out for and observe any bats using the area) at the two turbines (T3 & T4) that were the subject of the surveys that were carried out during this period.

46. Given the short nature of the 2014 transect routes, the relatively limited bat activity recorded, mapping figures were not deemed to be necessary.

2018

47. The site of the proposed development was visited on three occasions between late August and early October 2018 to assess the level of bat activity in the area around the site of the proposed wind turbine installation. Both hand-held and static bat detectors were used to record the ultrasonic calls of bats. Details of each of the visits are provided in Table 6 below.

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[7] Survey area consisted of 200m buffer around the developable area (100m plus rotor radius (45m)), i.e. 345m in total.

Table 6 - Bat Activity Survey dates

Survey Type	Date of survey	Air Temp °C	Time of survey
Dusk survey	30th August 2018	11	2004 – 2234
Dusk survey	13th September 2018	12	1930 – 2200
Dusk survey	10th October 2018	17	1824 – 2054

48. Crepuscular surveys were conducted during periods of favourable weather (light or no wind, air temperature >10° Celsius, no precipitation) using a hand-held Wildlife Acoustics Echo Meter Touch bat detector (or a Batlogger M) to assess bat activity. These surveys commenced 15 minutes before sunset (for dusk surveys), with each survey lasting for 2.5 hours. Each survey involved walking along a pre-determined, looping line transect which included all habitat features identified on site as having the potential to attract roosting, commuting and / or foraging bats within 150m of the proposed turbines (100m plus rotor radius). The bat detector recorded the activity of each bat species encountered as well as its spatial location and time of activity.

49. Numerous listening points were positioned along the transect route; at each of these points the surveyor would stop for a period of 3-5 minutes to record any bat activity. These listening points were selected to be within (or in close proximity to) a habitat feature which was likely to be used by bats (i.e. a hedgerow), as well as the proposed turbine locations.

50. All bat passes were recorded through the Wildlife Acoustics Echo Meter Touch app onto the phone/tablet memory, where it was stored for later analysis using Wildlife Acoustics Kaleidoscope Pro software. Or in the case of the Batlogger M the data was recorded on to the inserted SD card for later analysis using BatExplorer software.

51. Survey transect routes are shown on Figures 1 – 3 (Appendix 4), and the results of manual surveys are provided in the charts below. Areas of bat activity are also mapped on Figures 1 – 3.

Automated Monitoring

52. Various ultrasonic detectors with omnidirectional microphones were used during the automated monitoring sessions. All detectors were set to record simultaneously (during each session) to allow a comparison of results to be made. Detectors were programmed to record, beginning 30 minutes prior to sunset until 30 minutes after sunrise each night. The location of the detectors, including photographs (with a brief description) are contained in Appendix 3.

2014

53. Automated passive monitoring was undertaken across 5 nights on a monthly basis between the 14th May and 22nd September 2014. This was carried out at the proposed turbine locations for T3 & T4. The detectors were not paired with adjacent habitat features during the 2014 surveys.

2018

54. Automated passive monitoring was also undertaken across 11 – 18 nights (depending on turbine) between the 22nd August and 10th October 2018). This was carried out simultaneously (using pairs of calibrated detector units (SM2Bat+/SMZC/SM4ZC or Anabat Express')) at each turbine location and the nearest habitat feature.

55. A non-standard monitoring period was used due to the fact that there was previous bat data for the site at Barr Cregg and the fact that the late summer and early autumn, is the period identified elsewhere in the published literature as the time of peak collision risk[8].

56. The locations of static monitoring equipment are shown on the photographs in Appendix 2 and on Figure 4. The results of the static monitoring are also provided in Appendix 1.

Results

Desk Study

57. The results of 2011 bat activity surveys confirmed commuting and foraging activity within the survey site. The majority of commuting and foraging was confined along watercourses and linear features such as treelines and hedgerows. On a few occasions' bats were observed commuting across open moorland. Bat species recorded included Leisler's bat, soprano pipistrelle, common pipistrelle and Myotis spp.

58. Consultation with the NIBG during 2011[9] revealed a total of 63 bat records, containing five of the eight known species of bats in Northern Ireland, within 15 km of the survey site. These included, common pipistrelle, soprano pipistrelle, Daubenton's bat, brown long-eared bat and Leisler's bat *Nyctalus leisleri*.

59. The nearest bat roost is located 2.3 km from the survey site. Four of the records are of bat roosts with an abundance of ≥100 bats. Three of these records are of Pipistrelle spp. and one is of a roost of an unidentified bat species. There are no bat records within the survey site or within 200 m of the developable area[10].

60. The desk study also revealed records from the Bat Conservation Ireland's 'Daubenton's Bat Waterway Survey' sourced through the Biodiversity Maps website (https://maps.biodiversityireland.ie). A total of five records of Daubenton's bats were revealed. The nearest record was 1.4 km from the survey site.

Pre-Survey Site Visit

61. The daytime inspection of trees within 200m of the developable area (345m) did not reveal any trees with BRP (Bat Roost Potential). Trees present are of insufficient age to have developed any holes (as a result of damage or disease), consequently their BRP is negligible.

62. An external inspection survey of the build structures similarly, revealed that all buildings within the survey area were negligible, due the type of construction used (i.e. corrugated tin agricultural sheds). In addition to this, daytime inspections did not identify any droppings, urine/oil stains or feeding remains (which would indicate evidence of bat activity). Although it is recognised that bats often leave little evidence of their presence.

[8] **Understanding the Risk to European Protected Species (bats) at Onshore Wind Turbine Sites to inform Risk Management** Final Report (Sept 2016) Fiona Mathews, Suzanne Richardson, Paul Lintott, David Hosken.

[9] At the time of going to print bat records had not yet been received, therefore, the earlier 2011 records have been used.

[10] Survey area consisted of 200m buffer around the developable area (100m plus rotor radius (45m)), i.e. 345m in total.

63. Two structures (Building A within 544m of the turbines and Building B within 844m), were considered to have medium/low BRP. However, as these will not be impacted upon by the Development (and given their respective distances from the nearest turbine), specific emergence surveys were not required. As the buildings will remain untouched and will not be lit or disturbed.

Emergence Surveys

64. However, on the 10th October at the end of the transect survey a bat was seen to emerge from Building A. This was considered unusual as the bats (both soprano & common pipistrelle) being heard on the bat detector should have long finished emerging by this time. The emergence activity was recorded for later analysis (using thermal imaging technology, which has advanced significantly (and has also become more affordable) in recent years). In total 12 bats were noted to emergence from the top right corner of a boarded-up window.

65. Therefore, (as a precaution) a further emergence survey was carried out on the 17th October. Although very late in the season, bats were noted to be still using the structure, and temperatures were mild enough for bats to be active.

66. The survey commenced 30mins prior to sunset and continued for 2.5hrs after (given the lateness of the initial emergence). Bat activity (soprano/common pipistrelle) was noted at 1902 (40mins after dusk), however, these bats were foraging around the trees and none were seen to emerge from Building A. Activity was continuous for approximately 15mins, after which the bats moved away.

67. Two bats were finally noted to emerge at 1936hrs, a full 75mins after dusk. The third at 2008hrs. A further four bats were recorded to emerge around 2018 (a full 2 hours after dusk (1822hrs). In total 7 bats were noted to emergence survey.

68. Further analysis of both the thermal imaging videos and echolocation calls revealed the species emerging from the roost to be brown long-eared bats. This species has a very quiet echolocation call, tends to emerge only when completely dark (from approximately 1hr after dark); and typically lives in small colonies of between 10 to 20 bats.

69. The late emergence at Barr Cregg was possibly as a result of flood lighting from a farmyard (some distance away) spilling on to the roost entrance. This was possibly more pronounced with as the leaves had begun to fall, allowing more light to reach the building.

70. It is notable (according to Matthews et al) that very few casualties[11] have been found of common and widespread species such as brown long-eared bats at wind installations. This species is also considered to be low risk of collision (Natural England 2009, 2014).

Transect Results

2014

71. Dusk Survey, 15th May: a total of 9 bat passes were recorded. Two species were recorded during this session – Leisler's bat (n=8) and Daubenton's bat (n=1). The latter was flying along the drain while the former were passing overhead commuting

[11] A single fatality was attributed to brown long-eared bat (out of a total of 120) recorded during the surveys conducted by Matthews et all at 46 commercial wind turbine sites, from 2011 to 2013 inclusive.

across the site.

72. Dusk Survey, 29th July: a total of 5 bat passes were recorded. A single species was recorded during this session – Leisler's bat (n=5). Based on the timings and spacing between registrations there were approximately 4 Leisler's passing overhead across the site.

73. Dusk Survey, 03rd September: a total of 31 bat passes were recorded. Three species were recorded during this session – common (n=19) & soprano pipistrelles (n=19) and Leisler's bat (n=8). All registrations were recorded within a few meters of the main drain which runs NNE through the centre of the site.

2018

74. Dusk Survey, 29th August 2018: a total of 26 bat passes were recorded. Four species were recorded during this session – common & soprano pipistrelles, Leisler's bat and Daubenton's bat.

75. The majority of passes (N=10) were from Leisler's bats which were detected while commuting in various locations across the transect (see Figure 1). Although most activity was concentrated across the central part of the site. Most the Leisler's that were observed were flying at approximately 8-12m height. This is below the swept path of the proposed turbines (lowest swept path 45m).

76. Common pipistrelle (N=6) and soprano pipistrelle (N=8) were both widely spaced towards the southern boundary of the site; while the Daubenton's bats (N=2) were both recorded towards the NE corner of the site between T6 and the adjacent stream corridor.

77. Chart 1 below summarises the results of the spring transect survey. Figure 1 (overleaf) gives a visual representation of the locations of bat passes recorded (from the relative position of the observer and bat detector at the time of the registration). Bat passes during the spring transect were recorded using a Batlogger M from Elekon.

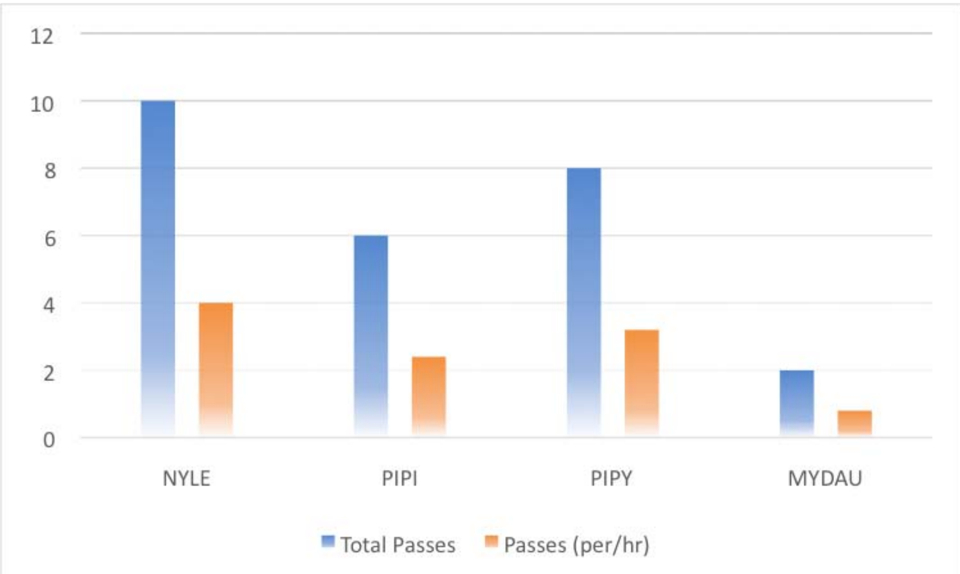


Chart 1 – Bat activity during the first transect survey (29/08/18).

78. The Dusk Survey of the 13th September 2018: recorded a total of 2 bat passes; this time a single species was recorded Leisler's bat (Chart 2 & Figure 2). Both passes

were in the NE corner between T6 and the adjacent stream corridor.

79. The Dusk Survey of the 10th October 2018: recorded a total of 104 bat passes. However, all bat activity was >500m from the nearest turbine location (i.e. close to the river). Two bat species were recorded (Chart 3 & Figure 3); common pipistrelle (N=69) and soprano pipistrelle (N=35).

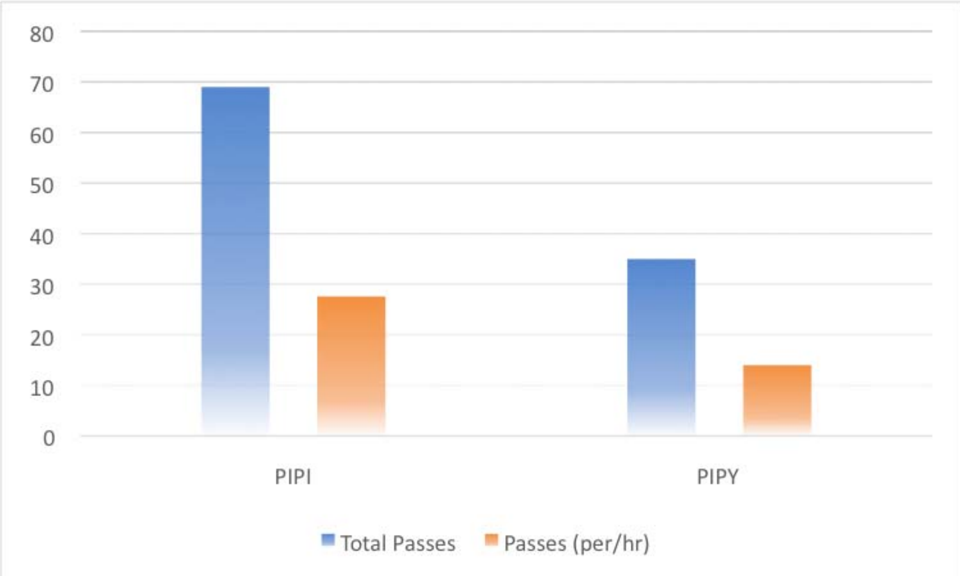


Chart 2 – Bat activity during the transect survey (10/10/18).

80. Overall, combined across the three 2018 transects the transects results are as follows;

- Common pipistrelle (n=75), 10 bat passes per hour;
- Leisler's bat (n=12), 1.6 bat passes/hour;
- Daubenton's bat (n=2), 0.26 bat passes/hour;
- soprano pipistrelle (n=43), 5.73 bat passes per hour.

81. During transect surveys, the greatest extent of bat activity was centred along the River Faughan to the north of the installation site, with fewer passes encountered on the open bog/heath.

Static Detector Results

82. Overall there were approximately 400 hours of recording at T3 & T4 during 2014; with a further 2323 hours of recording across the combined automated monitoring sessions during 2018.

83. There was significant variation in night length throughout the survey period, so the number of bat passes recorded during different months of the year are not directly comparable. In order to standardise bat activity between survey periods, results are displayed as a 'Bat Activity Index' (BAI), which is the total number of bat passes divided by the number of hours per night (Hundt 2012). This was calculated from sunset to sunrise, using publicly-available data from www.timeanddate.com.

84. At present there is not a standard system in the UK to categorise bat activity as low, moderate or high, because activity levels vary depending on the species involved and the location of the site. For the purposes of this report we use a bespoke system to discuss and compare levels of bat activity at the site, as outlined in the table

below. This approach uses standardised terms (e.g. occasional, frequent) to categorise bat activity indices within certain ranges; the average time interval between passes is also provided to give a more- intuitive interpretation of the terms. For the purposes of this assessment, we consider activity levels of occasional or higher (i.e. a BAI of >5) to be significant. This is similar to the threshold of 50 bat passes used in Mathews et al (2016) to define 'high bat activity', because 50 bat passes in a 10-hour night gives a BAI of 5.

85. It should be noted that activity levels should only be compared within a species and not between species, due to differences in the detection distances for each species and their flight characteristics. For example, if there are infrequent passes by brown long-eared bats (a species with short-range echolocation pulses) and occasional passes by Leisler's bats (which has longer-range echolocation pulses), it does not necessarily mean that Leisler's bats are more abundant than brown long-eared bats at that location.

Table 7 – Description of levels of bat activity (adopted from Matthews 2016)

Description	Bat Activity Index	Interval between passes
Negligible	<1	>60 minutes
Low	1 – 5	12 – 60 minutes
Moderate	5 – 12	5 – 12 minutes
High	12 – 60	1 – 5 minutes
Near-constant	>60	<1 minute

86. The abbreviations in the charts that follow are; NYLE – *Nyctalus leisler* (Leisler's bat)*i*; PIPI – *Pipistrellus pipistrellus* (common pipisitrelle); PIPY – *Pipistrellus pygmaeus* (soprano pipistrelle); PINA – *Pipistrellus nathusii* (Nathusius pipistrelle), and PLAUR – *Plecotus auritus* (brown long-eared bat) Myotis spp – *Myotis species* (collectively refers to Daubenton's bat *Myotis daubentonii*, whiskered bat *Myotis mystacinus* and Natterer's bat *Myotis nattereri*).

Turbine 1

87. The monitoring period at T1 & its adjacent habitat feature (i.e. the nearby stream) ran for a total of fifteen nights across two separate periods, (22nd to 29th August and 20th to 28th September). This equates to approximately 172.5 hours of recording (11.5 hours per night for fifteen nights).

88. On this occasion, the total number of bat passes was significantly lower at the proposed turbine location (n= 120) compared to the adjacent drain (habitat feature) which had (n= 883). However, there were marginally more bat passes attributed to Leisler's bat at the proposed turbine location (n= 75) as opposed to the adjacent stream (n= 24).

Table 8 – Total number of bat passes/bat activity index for T1

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	75	27	14	3	1
Passes (per/hr)	**0.43**	**0.16**	**0.08**	**0.02**	**0.005**

89. The overall activity levels (BAI) for most species were however, below 1 and this value is considered negligible. While the BAI for all species combined is **0.695** (bat passes per hour), this figure is considered to be negligible. Therefore, bat activity at T1 is assessed as negligible.

Table 9 – Total number of bat passes/bat activity index for T1's habitat feature (stream)

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	24	378	469	7	4	1
Passes (per/hr)	**0.12**	**2.19**	**2.72**	**0.04**	**0.02**	**0.005**

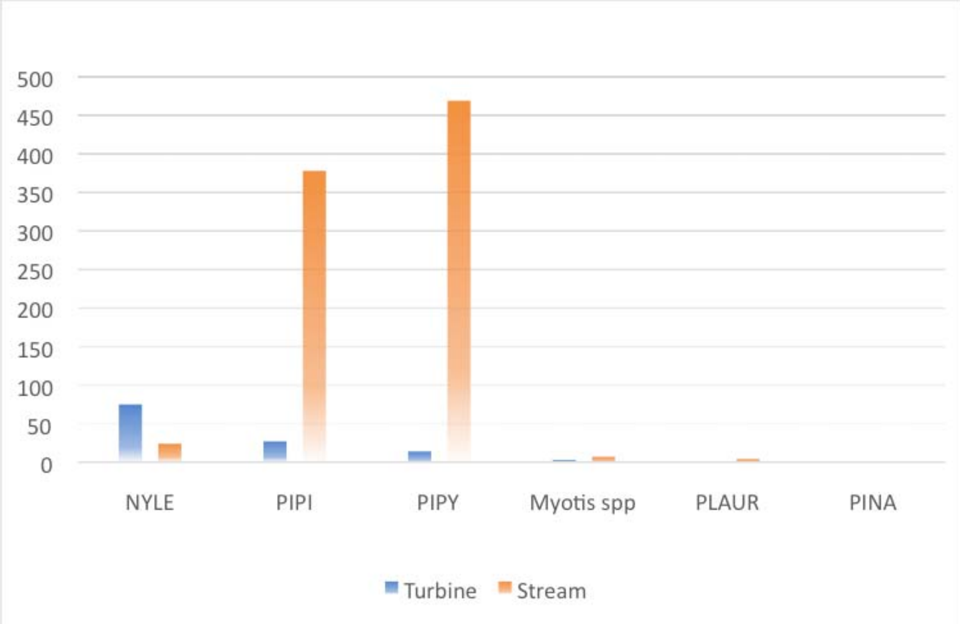


Chart 3 - Total bat passes recorded at T1 and adjacent stream.

90. The main point to note is that while activity levels for Leisler's bats were higher at the proposed turbine location (T=75; HF=24); overall numbers of bat passes were significantly lower at the turbine for all species combined (T=120; HF=883).

Turbine 2

91. The monitoring period at T2 & adjacent habitat feature (i.e. the stream) ran for a total for sixteen nights across a single continuous session (22nd August to 7th September). This equates to approximately 184 hours of recording (11.5 hours per night for sixteen nights).

92. On this occasion, the total number of bat passes was significantly lower at the proposed turbine location (n= 463) compared to the adjacent drain (habitat feature) which had (n= 1691). However, for Leisler's bat the number of passes at the proposed turbine locations was (n= 388), while at the adjacent habitat feature, the figure was (n= 197).

Table 10 – Total number of bat passes/bat activity index for T2

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	388	25	27	3	17	3
Passes (per/hr)	**2.11**	**0.14**	**0.15**	**0.016**	**0.09**	**0.016**

93. The overall activity levels (BAI) for most species were however, below 1 and this value is considered negligible. However, the figure for Leisler's bat is **2.11,** while the BAI for all species combined is **2.522** (bat passes per hour), this figure is considered to be **Low**. Therefore, bat activity at T2 is assessed as Low.

Table 11 – Total number of bat passes/bat activity index for T2's habitat feature (drain)

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	197	784	676	12	19	3
Passes (per/hr)	**1.07**	**4.26**	**3.67**	**0.07**	**0.1**	**0.016**

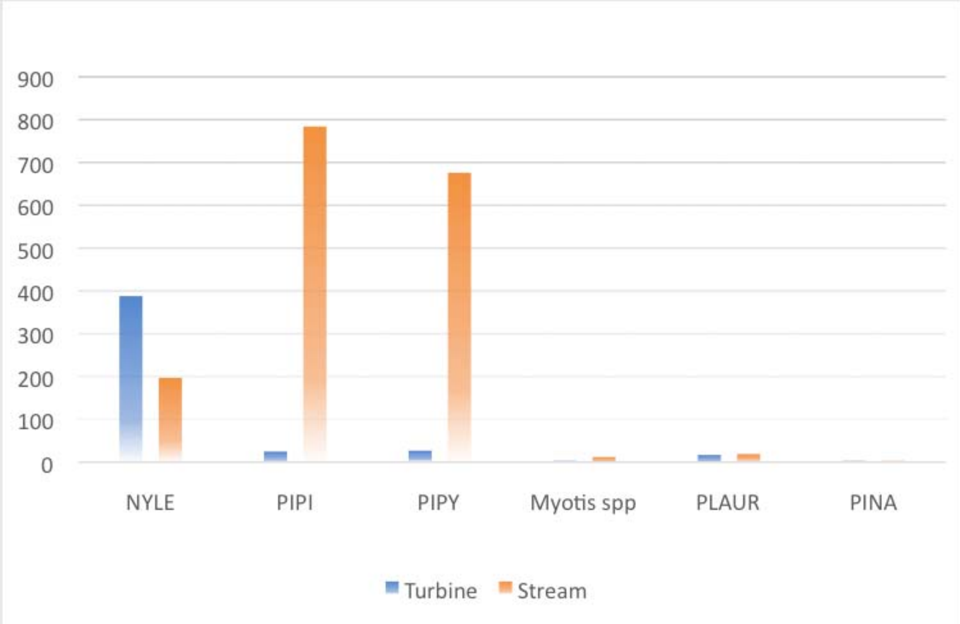


Chart 4 – Total bat passes recorded at T2 and adjacent stream.

Turbine 3

94. A total of 33 bat passes for all species combined was recorded at T3 during the 2014 static monitoring. This gives a BAI of 0.165; which is assessed to be negligible.

95. The (2018) monitoring period at T3 & adjacent habitat feature (i.e. the adjacent drain) ran for a total of thirteen nights across a single session, (23rd August to 5th September). This equates to approximately 149.5 hours of recording (11.5 hours per night for thirteen nights).

96. On this occasion, the total number of bat passes was higher at the proposed turbine location (n= 723) compared to the adjacent drain (habitat feature) which had (n= 220). However, the vast majority of the bat passes were attributed to Leisler's bat (T= 675; HF= 161).

Table 12 – Total number of bat passes/bat activity index for T3

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	675	27	15	4	1	1
Passes (per/hr)	**4.52**	**0.18**	**0.1**	**0.03**	**0.01**	**0.01**

97. The overall activity levels (BAI) for most species were however, below 1 and this value is considered negligible. However, the figure for Leisler's bat is **4.52,** while the BAI for all species combined is **4.85** (bat passes per hour), this figure is considered to be **Low**. Therefore, bat activity at T3 is assessed as Low.

98. However, if the static monitoring session have had been for the full 15-nights, then the BAI for this proposed turbine may have exceeded 5. Therefore, precautionary mitigation has been recommended.

Table 13 – Total number of bat passes/bat activity index for T3's habitat feature (drain)

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	161	29	20	6	3	1
Passes (per/hr)	**1.08**	**0.19**	**0.13**	**0.04**	**0.02**	**0.01**

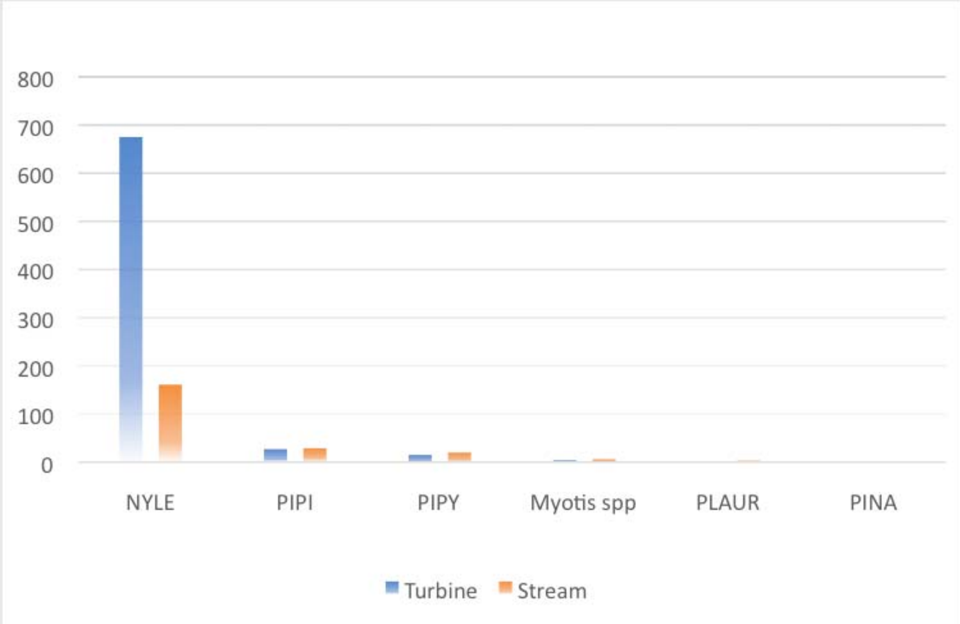


Chart 5 – Total bat passes at T3 and adjacent drain (i.e. habitat feature).

Turbine 4

99. A total of 307 bat passes for all species combined were recorded at T4 across the entire 200 hours of static monitoring carried out at this location. This gives a BAI of 1.54; which is assessed as **Low**. It is interesting to note that 131 of the passes were recorded on a single night (15th August 2014). This

100. The (2018) monitoring period at T4 & adjacent habitat feature (i.e. the adjacent drain) ran for a total of sixteen nights across a single session, (23rd August to 9th September). This equates to approximately 184 hours of recording (11.5 hours per night for sixteen nights).

101. Again, the total number of bat passes was about 50% lower at the turbine (n= 220) compared to the adjacent drain (habitat feature) which had (n= 420). However, there were almost twice as many passes attributed to Leisler's bat at the proposed turbine (n= 180), than at the corresponding habitat feature where (n= 99).

Table 14 – Total number of bat passes/bat activity index for T4

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	180	17	11	8	3	1
Passes (per/hr)	**0.98**	**0.09**	**0.06**	**0.04**	**0.016**	**0.005**

102. The overall activity levels (BAI) for each species were however, all below 1 and this value is considered negligible. Even when the BAI is combined for all species the BAI is 1.191 (bat passes per hour), this figure is **Low**. Therefore, bat activity at T4 is assessed as Low.

Table 15 – Total number of bat passes/bat activity index for T4's habitat feature (stream)

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	99	161	132	23	3	2
Passes (per/hr)	**0.54**	**0.88**	**0.7**	**0.13**	**0.016**	**0.01**

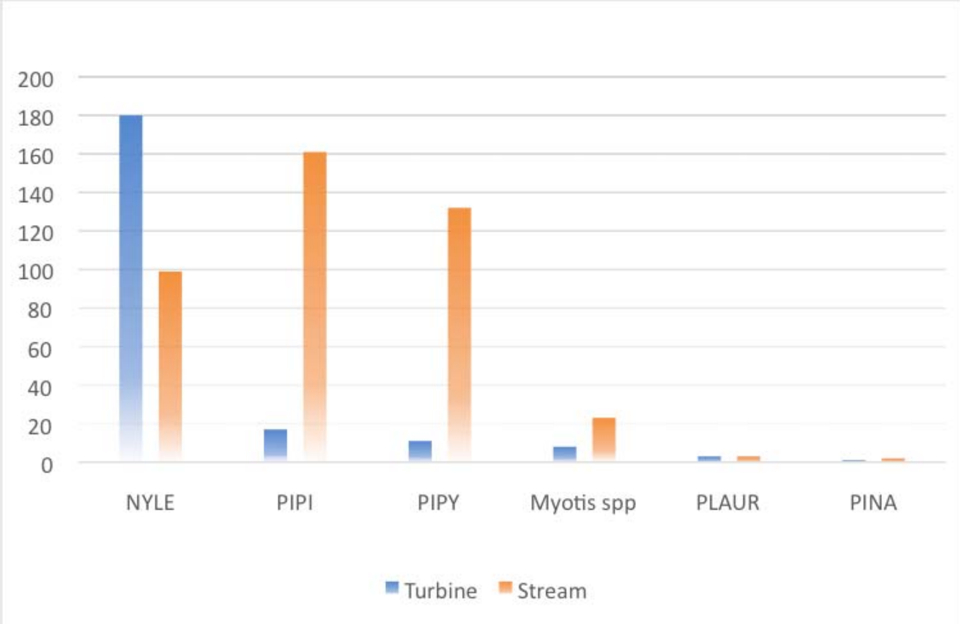


Chart 6 – Total bat passes at T4 and adjacent stream (i.e. habitat feature).

Turbine 5

103. The monitoring period at T5 & adjacent habitat feature (i.e. the nearby stream) ran for a total of eighteen nights across two separate periods, (23rd August to 1st September and 2nd to 11th October). This equates to approximately 207 hours of recording (11.5 hours per night for eighteen nights).

104. Again, the total number of bat passes was about 60% lower at the turbine (n= 181) compared to the adjacent stream (habitat feature) which had (n= 467). However, there was almost 50% more passes (n= 168) attributed to Leisler's bat at the proposed turbine than were recorded at the corresponding habitat feature where (n= 116).

Table 16 – Total number of bat passes/bat activity index for T5

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	168	6	5	1	1
Passes (per/hr)	**0.81**	**0.03**	**0.02**	**0.004**	**0.004**

105. The overall activity levels (BAI) for each species were however, all below 1 and this value is considered negligible. Even when the BAI is combined for all species the BAI (at the proposed Turbine) is 0.868 (bat passes per hour), the figure remains **negligible**.

Table 17 – Total number of bat passes/bat activity index for T5's habitat feature (stream)

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	116	113	228	1	7	2
Passes (per/hr)	**0.56**	**0.55**	**1.1**	**0.004**	**0.03**	**0.01**

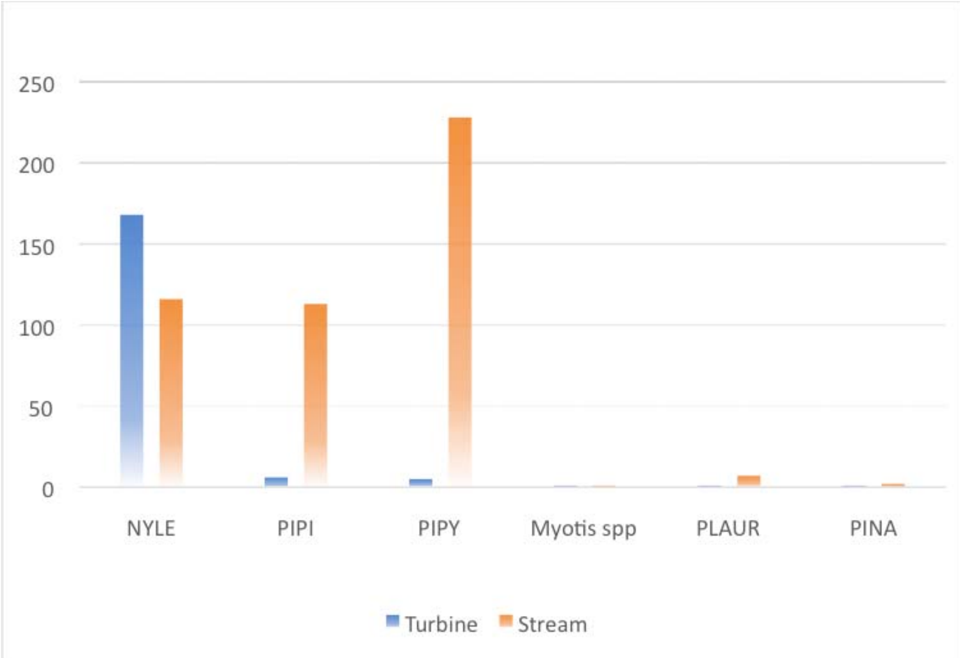


Chart 7 – Total bat passes at T5 and adjacent stream (i.e. habitat feature).

Turbine 6

106. The monitoring period at T6 & adjacent habitat feature (i.e. the nearby stream) ran for a total of twelve nights across a single session, (30th August to 11th September). This equates to approximately 138 hours of recording (11.5 hours per night for twelve nights).

107. This time however, the total number of bat passes was about 60% higher at the turbine (n= 763) compared to the adjacent stream (habitat feature) which had (n= 421). However, there was a significantly greater number of passes (n= 722) attributed to Leisler's bat at the proposed turbine than were recorded at the corresponding habitat feature where (n= 82).

Table 18 – Total number of bat passes/bat activity index for T6

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	722	11	10	7	13
Passes (per/hr)	**5.23**	**0.08**	**0.07**	**0.05**	**0.09**

108. Again, overall activity levels (BAI) for most species were below 1 and this value is considered negligible. However, the BAI for Leisler's bat was (at the proposed Turbine) is **5.52** (bat passes per hour), the figure is considered **Moderate**. Therefore, precautionary mitigation is required.

Table 19 – Total number of bat passes/bat activity index for T6's habitat feature (stream)

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	82	146	173	5	15
Passes (per/hr)	**0.59**	**1.06**	**1.25**	**0.04**	**0.11**

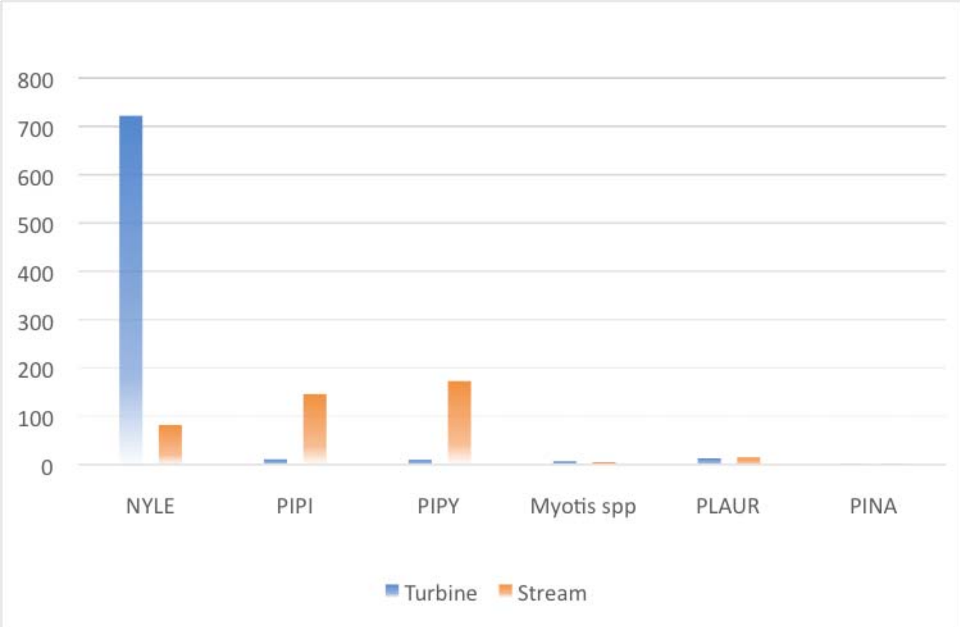


Chart 8 – Total bat passes at T6 and adjacent stream (i.e. habitat feature).

Turbine 7

109. The monitoring period at T7 & adjacent habitat feature (i.e. the nearby stream) ran for a total of eleven nights across a single session, (20th September 1st October). This equates to approximately 126.5 hours of recording (11.5 hours per night for eleven nights).

110. This time, the total number of bat passes was significantly lower at the turbine (n= 22) compared to the adjacent stream (habitat feature) which had (n= 1010). Also, bat passes attributed to Leisler's bat at the proposed turbine (n-9) were very low, as were the number recorded at the corresponding habitat feature where (n= 14).

Table 20 – Total number of bat passes/bat activity index for T6

	NYLE	PIPI	PIPY	PLAUR
Total Passes	9	4	7	2
Passes (per/hr)	**0.07**	**0.03**	**0.06**	**0.02**

111. Again, overall activity levels (BAI) for most species (at the proposed turbine location) were below 1 and this value is considered **negligible**.

Table 21 – Total number of bat passes/bat activity index for T6's habitat feature (stream)

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	14	490	482	10	14
Passes (per/hr)	**0.11**	**3.87**	**3.81**	**0.08**	**0.11**

112. The BAI at the habitat feature was **7.98**, this figure is considered to be moderate. However, the habitat feature is 170m distance from the proposed location of T7.

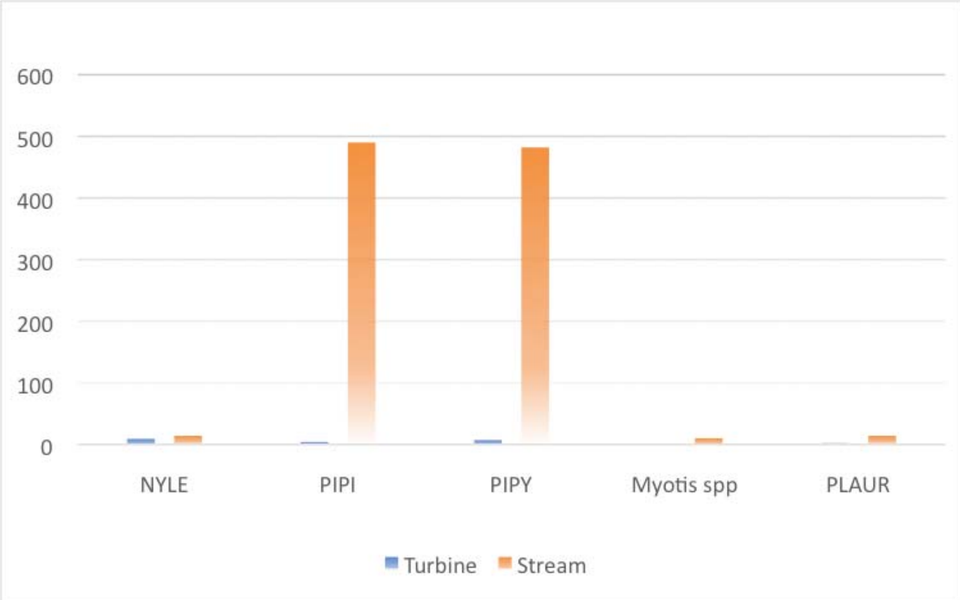


Chart 9 – Total bat passes at T7 and adjacent stream (i.e. habitat feature).

Assessment

Survey Constraints

113. There were no constraints to survey noted during either the transects or automated monitoring sessions. Meteorological conditions were reasonably favourable for bat activity, access to site was unimpeded and all equipment functioned normally. As a consequence, the data provided is considered to be sound and sufficient to allow an assessment to be completed.

Discussion

114. Recent University of Exeter / DEFRA research has led NED to adopting a more precautionary approach when assessing the likely impact of wind turbines on bat populations. NED also considers that any proposed mitigation must consider the results of the recent research.

115. Therefore, a review of the DEFRA report was undertaken with specific reference to the site at Barr Cregg.

116. The DEFRA (2016) report concluded that: -

- Bat casualty rates at British wind farms are similar to those recorded elsewhere in Europe. At a third of sites studied no casualties were found. From the DEFRA project it is not possible to conclude whether or not there is an impact on local or national bat populations;
- The species most at risk from collisions are common pipistrelle, soprano pipistrelle and noctule bats;
- Casualty rates are highly variable. Most of this variability appears to be due to site-specific factors, and is not simply explained by differences in bat activity levels; collision risk is generally lowest at locations with low bat activity;
- The size of the wind turbine installation had no link with the per turbine casualty rate;

- Turbines with larger blade lengths pose an increased risk to bats, and this is stronger predictor than the height of the nacelle;
- Most fatalities occur on nights of relatively low mean wind speed (<5m/s at ground level). All casualties occurred on nights with mean wind speed <10m/s;
- The presence of woodland within a 1500m radius of the centre of wind farms appears to reduce the risk to pipistrelles but increase the risk to noctule bats;
- Trained search dogs are the most effective way of identifying dead bats at turbines;
- Acoustic recordings at ground level and nacelle give different estimates of the relative abundance of species on site, with ground level recordings underestimating the abundance of soprano pipistrelle and noctule bats within the rotor swept area;
- Bat activity shows extremely high variability. Much longer monitoring periods than are currently used as standard practice are therefore required for robust estimation of bat activity.

117. This relates to Barr Cregg in that;

   a. Activity levels were significantly lower at the proposed turbine than at adjacent habitat features for all species (except Leisler's bat at T3 & T6). This is likely due to the proximity of the more favourable foraging areas nearby (i.e. the River Faughan & associated woodland);
   b. There is a substantial area of broadleaved or mixed woodland (excluding conifers) within 1.5km of the 7 turbines (27ha approximately). For all bats collectively, this is associated with an 18% fall in collision risk (according to the DEFRA report). For every percentage point increase in woodland cover within the buffer;
   c. A Bat Monitoring & Mitigation Plan has been recommended (which includes the used of trained search dogs).

Potential Impacts

Construction phase

118. Site clearance works will involve the localised removal of vegetation particularly at the access to and proposed crossing of the Burntollet River. However, there are similar habitats throughout the site and surrounding area, so the removal of these vegetation features will not have a significant impact on any bat species.

Operation phase

119. Although bat fatalities have been reported from operational windfarms in North America and parts of Europe for almost twenty years, evidence from Britain and Ireland has only begun to emerge in recent years. The publication in 2016 of a large-scale study by researchers at Exeter University (Mathews et al.), which was based on observations of bat activity and carcass searches at 46 operational wind farms throughout Britain (but excluding NI).

120. Bat carcasses were found at two-thirds of these sites, of which 48% of fatalities were common pipistrelles, 40% were soprano pipistrelles and 10% were noctule bats (which are closely related to Leisler's bats, and in fact this species is commonly referred to as the lesser noctule across much of the rest of Europe).

121. The estimated casualty rates, which were corrected for predator removals and the efficiency of the searchers, ranged from 0 - 5.25 bats per turbine per month, and from 0 - 77 bats per site per month, during the period of the study. As with previous studies on bats & windfarms, there was a relationship between weather conditions and recorded bat fatalities: most nights where casualties occurred (81.5%) had low

mean wind speeds (less than or equal to 5m/s measured at the ground} and maximum night-time temperatures of >10ºC. However, it was also estimated that 95.3% of nights with mean wind speeds >5m/s would have no casualties.

122. The study revealed no clear relationship between recorded bat activity levels and the number of fatalities recorded at a site, as follows: "*Activity at the control locations (a proxy for pre-construction surveys) was not a useful predictor of the number of bat casualties, although it was a predictor of whether or not any casualties occurred (i.e. a binary yes/no categorisation*)".

123. The nights of highest pipistrelle activity were considered to have the highest likelihood of casualties, although bat fatalities were only recorded in one third of locations. In the Mathews et al. (2016) study, 'high activity' was defined as a night with more than 50 bat passes, which is similar to the BAI of 5 used in this assessment (i.e. 50 bat passes over a 10-hour night gives a BAI of 5).

124. Fatality research studies elsewhere in Europe have shown that, due to their different behaviour and flight style, bat species are affected differently by wind turbines (Rodrigues et al., 2014, Natural England, 2014). The only species recorded in significant numbers (and in close proximity to the proposed turbines) at Barr Cregg were Leisler's bats. This species is considered to have a high risk of collision with wind turbines, and a high risk that collision-related mortalities could affect their populations (Natural England, 2014). On this basis, the risk of impacts for this species are assessed below.

125. Significant activity levels were recorded on 11 nights, (combined for T3 & T6). Overall, there were significant levels of bat activity (i.e. a BAI of >5) at these turbines on 24% of the 25 survey nights, with negligible or low activity on all other nights.

126. Therefore, these (2) turbines may present a risk to Leisler's bats during the late-summer/early-autumn period. It is not possible to make a prediction about the number of bats that may be affected, but in a worst-case scenario it is possible that there could be a significant impact on local populations of this species.

127. All bat species receive strict protection under the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (S.I. 1995/380, as amended), under which it is an offence to kill, injure or disturb any bat species. In accordance with policy NH 2 of the Planning Policy Statement 2: Natural Heritage (DOENI, 2013), planning permission will only be granted for a development that is not likely to harm any protected species (subject to suitable mitigation measures).

Decommissioning phase

128. All decommissioning work will be carried out from internal access tracks and hardstanding areas, so it will not be necessary to clear any trees, hedgerows or other vegetation. As a result, there will be no impact on feeding areas or commuting routes.

Mitigation

129. Under the precautionary principle, and due to the presence of bat species known for open-air foraging (i.e. considered at (high) risk from turbine associated mortality (i.e. Leisler's bats) a Bat Mitigation & Monitoring Plan (BMMP) has been recommended. This will be implemented at T3 & T6 and in a surrounding 125m buffer area.

130. Monitoring, (in the form of bat mortality surveys), will be undertaken for the first 5-years (post-consent (if approved)) and will be reviewed annually to determine whether remedial action is required to mitigate the effects of the Development on bats. In the event that a bat carcass if found, NIEA NED will be immediately contacted in order to discuss/agree the implementation of mitigation measures.

131. At the end of year 5, the data will be reviewed to determine whether monitoring should continue.

Table 22 - Summary of Bat Mitigation & Monitoring Plan (BMMP)

Task	Year	Timing
Bat Carcass Searches using Trained Dog & Handler Team	1, 2, 3, 4 & 5	35 visits (2 weeks of intensive daily carcass searches) each during spring, and summer; with 3 weeks in autumn). Searches will only be carried out after optimal meteorological conditions for bats)

Bat Carcass (Mortality) Searches

132. Bat carcass searches will be undertaken using a specialist ECoW. Searches will be undertaken across 35 days during each season; the exact timing/spacing will be at the discretion of the ECoW. However, searches will only take place the morning after optimal conditions for bats have occurred. These are defined as;

- <5m/s ground wind speed,
- >10ºC of temperature (1 hour after dusk),
- no rain, and
- after a warm day of similar settled conditions (i.e. the dusk should have a peak in bat activity in the area).

133. Carcass searches will commence one hour after dawn to minimise the potential for carcass removal by predators.

134. This approach has been selected to maximise the likelihood of finding bat carcasses, which is essential in enabling predicted bat mortality to be accurately estimated. Bat carcasses will be collected (if found) to enable accurate species identification using DNA where required.

Meteorological Data

135. Simultaneous daily collection of meteorological data including wind speed, temperature, and precipitation will be undertaken at the turbine location, alongside bat carcass searches to identify the effect on levels of bat activity at the turbine.

Operational curtailment

136. In the event that a dead bat is found during carcass searches at either T3 or T6, curtailment of the particular turbine will be immediately implemented on a precautionary basis. This will involve increasing the cut-in speed to 5 m/s, which is recommended by Mathews et al (2016). As bats are nocturnal, the increased cut-in speed will only apply at night, measured from 30 minutes before sunset to 30 minutes after sunrise. The increased cut-in speed will only apply between the 01st

May and the 30th September each year (i.e. the generally accepted bat activity season in NI). For the remainder of the year {i.e. 01st October to 30th April), the turbine manufacturer's cut-in speed will be used.

137. In addition, the turbine will be feathered when winds are below cut-in speed, which will involve pitching the blades to 90° and/or rotating the blades parallel to the wind. This will prevent the turbines from freewheeling or idling, and reduce the rotation rate to the minimum level required, ideally to below one revolution per minute. This will substantially reduce the risk of bats being struck by idling blades, and will reduce the spatial extent of low-pressure vortices in the wake of the blades (i.e. will substantially reduce the potential for barotrauma to occur).

Search efficiency trials

138. In addition to the proposed operational curtailment, the efficiency of the search dogs will be assessed based on integrated efficiency trials (Mathews et al., 2016). Use of this method will allow a correction factor for search efficiency to be factored into statistical modelling of numbers of bats which may be found dead beneath any turbines.

139. Carcasses will be dropped from waist height at randomly selected points within the search area under turbines, on days when the dog teams are conducting searches and prior to searches taking place. The person placing the bats will not be involved in the search and will not reveal the exact number and location of bats that have been deployed to the dog teams until the trial is concluded.

140. When conducting observer efficiency trials for dog search teams, care will be taken to avoid transferring human scent to the specimen, for example by using tongs or disposable gloves. To allow human scent from footprints to dissipate, an interval of at least an hour will be left between placing the bats and conducting the searcher efficiency trial.

Scavenger removal rates

141. In order to determine the rate at which carcasses are removed (and therefore not be available for dogs to find), scavenger removal trials will be completed.

142. A carcass (of similar size and colour to a bat) will be left under two different turbines in the wind farm each season. The carcasses will be placed out around dusk, and transference of human smell will be avoided. Carcasses will not be left under turbines if and when searches are being carried out at these turbines.

143. The carcasses will be monitored through the use of a motion-activated remotely operated camera for up to 10 days (battery life is affected by weather and the number of times the camera is triggered and is not entirely predictable). A second visit will be made to the site to check the cameras and change the batteries to ensure we can assess the scavenging rates over a three-week period. Assessing rates over a shorter timeframe would not enable a true test of scavenging removal rates to be made (Mathews et al., 2016). Different habitat types will be selected for the trials to ensure a robust evaluation of scavenging rates can be made.

144. The methods used in the Matthews (2016) study involved daily visits, rather than camera traps, to check corpses for the first seven days, but the use of camera traps will be more resource efficient and should also indicate the time at which the corpse was taken as well as the species of scavenger in most cases.

145. Different locations will be selected for the carcasses during each visit so that scavengers do not become familiar with feeding locations, and the cameras will be repositioned accordingly.

Estimating actual mortality rates

146. The number of observed bat carcasses recorded during the study will be corrected taking into account the area searched, scavenger rates and searcher efficiency results. Various researchers have proposed different approaches to data correction including Korner-Nievergelt et al. (2011), Korner-Nievergelt, et al. (2011), Bispo et al. (2012), and Lintott et al. (2016).

147. The most up to date formula for estimating the total number of carcasses present per turbine per season will be applied to the data collected at the end of the survey season

Remedial Measures

148. The trigger threshold for remedial measures will be linked to 'significance' in line with the CIEEM guidelines for EcIA. Remedial measures will be triggered by an impact predicted to be of significance to bats at the Local level or greater.

149. For geographic context, the local level is considered to represent the site boundary plus a 15km radius (for Leisler's bats). A significant effect would be triggered where the level of bat mortality is considered to reduce the ability of the bat population at the Local scale to sustain a viable and stable population, as informed by monitoring.

150. The requirement for and design of additional remedial measures will depend upon the findings and conclusions of monitoring and specific measures will be developed as appropriate to mitigate and significant impact predicted (those considered significant to bat populations at the Local scale or above). Where significant impacts are predicted, potential remedial options may include, but are not limited to, the feathering of the turbine.

Bat Roost

151. In addition, during construction an exclusion area will be placed around the bat roost at Building A (i.e. barrier fencing will be installed which surrounds the outside of the trees which encircle Building A). Construction operatives will be made aware of the presence of the roost, and of the need to stay out of the exclusion area at all times. No lighting will be allowed to spill towards the roost at anytime.

152. Monitoring of the roost will be undertaken as part of the BMMP to monitor the numbers and health of the roost (annually for 5 years).

Conclusions

153. The implementation of the BMMP (at T3 & T6) should substantially reduce the risk of fatalities at these locations. There is a high degree of confidence in the effectiveness of the measures described (as it has been demonstrated to reduce bat fatalities in peer-reviewed studies (e.g. Arnett et al. 2013) and is widely implemented elsewhere in Europe.

154. Overall, the potential impacts to the local bat population (and in particular to Leisler's bats) should be reduced to a **not significant** with the implementation of

the mitigation measures (as outlined above).

References

Altrincham. J. D, (2003) British Bats.

Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists – Good Practice Guidelines.* 3rd edition. Bat Conservation Trust, London.

Matthews et al (2003) Effectiveness of search dogs compared with human observers in locating bat carcasses at wind-turbine sites: A blinded randomized trial, Wildlife Society Bulletin.

Roche, N. et al (2014) *Irish Bats in the 21st Century.* Bat Conservation Ireland.

Rodrigues, L., L. Bach, M.J. Dubourg-Savage, J. Goodwin & C. Harbusch (2008): Guidelines for consideration of bats in wind farm projects. EUROBATS Publication Series No. 3 (English version). UNEP/EUROBATS Secretariat, Bonn, Germany.

Wray S, Wells D, Long E, Mitchell-Jones T (December 2010) Valuing Bats in Ecological Impact Assessment, IEEM In-Practice p 23-25.

Appendix 1 – Static Detector Data (2014)

2014 Barr Cregg Static Detector Results

May

T3

	PIPY	PIPI	NYLE
14th – 15th May	-	1	-
15th – 16th May	-	-	-
16th – 17th May	2	2	-
17th – 18th May	-	1	-
18th – 19th May	-	-	1
Totals	**2**	**4**	**1**

All nights data combined – five nights at 8 hours recording time per night = 40 hours recording

	PIPY	PIPI	NYLE
Total Passes	2	4	1
Passes (per/hr)	**0.05**	**0.1**	**0.025**

T4

	PIPI	NYLE
14th – 15th May	2	-
15th – 16th May	1	-
16th – 17th May	-	1
17th – 18th May	-	-
18th – 19th May	-	-
Totals	**3**	**1**

All nights data combined – five nights at 8 hours recording time per night = 40 hours recording

	PIPI	NYLE
Total Passes	3	1
Passes (per/hr)	**0.075**	**0.025**

June

T3

	PIPI
18th – 19th June	2
19th – 20th June	2
20th – 21st June	1
21st – 22nd June	-
22nd – 23rd June	1
Totals	**6**

All nights data combined – five nights at 8 hours recording time per night = 40 hours recording

	PIPI
Total Passes	6
Passes (per/hr)	**0.15**

T4

	PIPY	PIPI	NYLE
18th – 19th June	-	1	-

19th – 20th June	2	13	-
20th – 21st June	15	23	2
21st – 22nd June	16	22	-
22nd – 23rd June	2	8	-
Totals	**35**	**67**	**2**

All nights data combined – five nights at 8 hours recording time per night = 40 hours recording

	PIPY	**PIPI**	**NYLE**
Total Passes	35	67	2
Passes (per/hr)	**0.875**	**1.675**	**0.05**

July

T3 & T4

27th July – 1st Aug	NO BATS RECORDED

August

T3

15th – 20th Aug	NO BATS RECORDED

T4

	PIPY	**PIPI**	**NYLE**	**Myotis spp**
15th – 16th Aug	22	107	2	-
16th – 17th Aug	4	1	4	1
17th – 18th Aug	-	-	1	-
18th – 19th Aug	-	2	2	-
19th – 20th Aug	5	34	2	-
Totals	**31**	**144**	**11**	**1**

All nights data combined – five nights at 8 hours recording time per night = 40 hours recording

	PIPY	**PIPI**	**NYLE**	**Myotis spp**
Total Passes	31	144	11	1
Passes (per/hr)	**0.775**	**3.6**	**0.275**	**0.025**

September

T3

	PIPY	**PIPI**	**Myotis spp**
15th – 16th Sept	-	2	-
16th – 17th Sept	1	-	-
17th – 18th Sept	-	6	-
18th – 19th Sept	1	4	2
19th – 20th Sept	1	3	-
Totals	**3**	**15**	**2**

All nights data combined – five nights at 8 hours recording time per night = 40 hours recording

	PIPY	**PIPI**	**Myotis spp**
Total Passes	3	15	2
Passes (per/hr)	**0.075**	**0.375**	**0.05**

T4

	PIPY	PIPI
15^{th} – 16^{th} Sept	2	1
16^{th} – 17^{th} Sept	1	1
17^{th} – 18^{th} Sept	1	1
18^{th} – 19^{th} Sept	-	-
19^{th} – 20^{th} Sept	2	3
Totals	**6**	**6**

All nights data combined – five nights at 8 hours recording time per night = 40 hours recording

	PIPY	PIPI
Total Passes	6	6
Passes (per/hr)	**0.15**	**0.15**

Appendix 2 – Static Detector Data (2018)

Barr Cregg Static Analysis

T1

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
22nd – 23rd Aug	13	4	1	-	-
23rd – 24th Aug	6	1	-	1	1
24th- 25th Aug	10	1	-	-	-
25th – 26th Aug	9	10	7	1	-
26th – 27th Aug	8	-	1	-	-
27th – 28th Aug	13	1	1	-	-
28th – 29th Aug	4	-	1	-	-
20th – 21st Sept	-	-	-	-	-
21st – 22nd Sept	1	-	-	-	-
22nd – 23rd Sept	-	-	-	1	-
23rd – 24th Sept	-	-	-	-	-
24th – 25th Sept	1	1	-	-	-
25th – 26th Sept	-	-	-	-	-
26th – 27th Sept	1	1	2	-	-
27th – 28th Sept	9	8	1	-	-
Totals	**75**	**27**	**14**	**3**	**1**

All night's data combined – fifteen nights at 11.5 hours recording time per night = 172.5 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	75	27	14	3	1
Passes (per/hr)	**0.43**	**0.16**	**0.08**	**0.02**	**0.005**

T1 Feature

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
22nd – 23rd Aug	5	68	78	1	1	1
23rd – 24th Aug	-	74	37	1	2	-
24th- 25th Aug	2	37	37	-	-	-
25th – 26th Aug	-	160	105	1	-	-
26th – 27th Aug	2	11	30	-	-	-
27th – 28th Aug	12	25	157	3	1	-
28th – 29th Aug	3	3	21	1	-	-
20th – 21st Sept	-	-	1	-	-	-
21st – 22nd Sept	-	-	-	-	-	-
22nd – 23rd Sept	-	-	-	-	-	-
23rd – 24th Sept	-	-	-	-	-	-
24th – 25th Sept	-	-	-	-	-	-
25th – 26th Sept	-	-	-	-	-	-
26th – 27th Sept	-	-	-	-	-	-
27th – 28th Sept	-	-	3	-	-	-
Totals	**24**	**378**	**469**	**7**	**4**	**1**

All night's data combined – fifteen nights at 11.5 hours recording time per night = 172.5 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	24	378	469	7	4	1
Passes (per/hr)	**0.12**	**2.19**	**2.72**	**0.04**	**0.02**	**0.005**

T2

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
22nd – 23rd Aug	16	-	1	-	1	-
23rd – 24th Aug	11	-	1	-	-	-
24th- 25th Aug	47	1	-	-	3	-
25th – 26th Aug	2	7	7	-	1	-
26th – 27th Aug	30	-	1	-	-	1
27th – 28th Aug	58	1	-	-	1	-
28th – 29th Aug	29	1	-	-	1	-
29th – 30th Aug	21	-	2	-	2	-
30th – 31st Aug	32	2	-	-	2	-
31st – 1st Sept	32	1	1	-	-	-
1st – 2nd Sept	43	2	5	-	2	-
2nd – 3rd Sept	5	3	6	1	-	1
3rd – 4th Sept	6	-	1	-	-	-
4th – 5th Sept	15	6	1	-	2	-
5th – 6th Sept	40	1	-	2	1	1
6th – 7th Sept	1	-	1	-	1	-
Totals	**388**	**25**	**27**	**3**	**17**	**3**

All night's data combined – sixteen nights at 11.5 hours recording time per night = 184 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	388	25	27	3	17	3
Passes (per/hr)	**2.11**	**0.14**	**0.15**	**0.016**	**0.09**	**0.016**

T2 Feature

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
22nd – 23rd Aug	-	40	44	-	2	-
23rd – 24th Aug	2	7	17	2	-	-
24th- 25th Aug	14	9	1	-	-	-
25th – 26th Aug	1	60	97	-	1	-
26th – 27th Aug	7	7	2	-	1	2
27th – 28th Aug	15	47	42	3	-	-
28th – 29th Aug	6	3	17	1	-	-
29th – 30th Aug	21	81	68	-	2	-
30th – 31st Aug	15	22	34	1	1	1
31st – 1st Sept	14	1	-	-	-	-
1st – 2nd Sept	50	216	150	3	5	-
2nd – 3rd Sept	6	16	10	-	-	-
3rd – 4th Sept	6	3	14	-	2	-
4th – 5th Sept	16	65	76	2	1	-
5th – 6th Sept	20	98	27	-	3	-
6th – 7th Sept	4	109	77	-	1	-
Totals	**197**	**784**	**676**	**12**	**19**	**3**

All night's data combined – sixteen nights at 11.5 hours recording time per night = 184 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	197	784	676	12	19	3
Passes (per/hr)	**1.07**	**4.26**	**3.67**	**0.07**	**0.1**	**0.016**

T3

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
23rd – 24th Aug	26	-	1	-	-	-
24th- 25th Aug	9	-	-	-	-	-
25th – 26th Aug	18	12	4	-	-	-
26th – 27th Aug	35	-	-	-	-	-
27th – 28th Aug	73	1	2	-	-	-
28th – 29th Aug	21	-	-	-	-	-
29th – 30th Aug	50	1	1	-	-	-
30th – 31st Aug	177	-	-	-	-	-
31st – 1st Sept	46	2	-	-	-	1
1st – 2nd Sept	118	6	4	2	-	-
2nd – 3rd Sept	35	4	3	-	-	-
3rd – 4th Sept	11	-	-	1	-	-
4th – 5th Sept	56	1	-	1	1	-
Totals	**675**	**27**	**15**	**4**	**1**	**1**

All night's data combined – thirteen nights at 11.5 hours recording time per night = 149.5 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	675	27	15	4	1	1
Passes (per/hr)	**4.52**	**0.18**	**0.1**	**0.03**	**0.01**	**0.01**

T3 Feature

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
23rd – 24th Aug	-	-	-	-	1	-
24th- 25th Aug	6	1	1	-	-	-
25th – 26th Aug	6	12	7	1	-	-
26th – 27th Aug	4	-	-	-	-	-
27th – 28th Aug	13	2	2	-	-	-
28th – 29th Aug	8	-	2	1	-	-
29th – 30th Aug	8	1	1	-	-	-
30th – 31st Aug	53	1	-	-	1	-
31st – 1st Sept	16	-	1	-	-	-
1st – 2nd Sept	23	6	4	3	-	-
2nd – 3rd Sept	2	1	2	1	1	-
3rd – 4th Sept	8	-	-	-	-	-
4th – 5th Sept	14	5	-	-	-	1
Totals	**161**	**29**	**20**	**6**	**3**	**1**

All night's data combined – thirteen nights at 11.5 hours recording time per night = 149.5 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	161	29	20	6	3	1
Passes (per/hr)	**1.08**	**0.19**	**0.13**	**0.04**	**0.02**	**0.01**

T4

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
23rd – 24th Aug	1	-	-	-	-	-
24th- 25th Aug	1	-	-	-	-	-
25th – 26th Aug	12	7	2	-	1	-
26th – 27th Aug	3	-	-	1	-	1
27th – 28th Aug	13	1	2	1	-	-
28th – 29th Aug	2	-	-	-	-	-
29th – 30th Aug	10	-	1	4	-	-
30th – 31st Aug	24	-	1	-	-	-
31st – 1st Sept	18	1	-	-	-	-
1st – 2nd Sept	20	3	3	-	-	-
2nd – 3rd Sept	4	1	-	-	-	-
3rd – 4th Sept	3	-	-	-	-	-
4th – 5th Sept	10	1	1	-	-	-
5th – 6th Sept	19	2	-	1	1	-
6th – 7th Sept	12	-	-	1	-	-
7th – 8th Sept	28	1	1	-	1	-
Totals	**180**	**17**	**11**	**8**	**3**	**1**

All night’s data combined – sixteen nights at 11.5 hours recording time per night = 184 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	180	17	11	8	3	1
Passes (per/hr)	**0.98**	**0.09**	**0.06**	**0.04**	**0.016**	**0.005**

T4 Feature

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
23rd – 24th Aug	7	1	1	-	-	-
24th- 25th Aug	4	1	2	1	-	-
25th – 26th Aug	9	33	20	2	-	1
26th – 27th Aug	5	2	2	-	-	-
27th – 28th Aug	6	10	9	1	-	-
28th – 29th Aug	4	3	1	2	1	-
29th – 30th Aug	8	25	11	2	-	-
30th – 31st Aug	14	7	2	3	-	-
31st – 1st Sept	3	2	-	-	-	-
1st – 2nd Sept	4	36	43	-	1	1
2nd – 3rd Sept	-	12	15	1	-	-
3rd – 4th Sept	-	-	3	2	-	-
4th – 5th Sept	6	9	11	-	-	-
5th – 6th Sept	10	13	4	4	-	-
6th – 7th Sept	9	-	4	1	-	-
7th – 8th Sept	10	7	4	4	1	-
Totals	**99**	**161**	**132**	**23**	**3**	**2**

All night’s data combined – sixteen nights at 11.5 hours recording time per night = 184 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	99	161	132	23	3	2
Passes (per/hr)	**0.54**	**0.88**	**0.7**	**0.13**	**0.016**	**0.01**

T5

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
23rd – 24th Aug	8	-	1	-	-
24th- 25th Aug	3	-	-	-	-
25th – 26th Aug	38	1	1	-	-
26th – 27th Aug	17	-	-	-	-
27th – 28th Aug	26	1	-	-	-
28th – 29th Aug	5	1	-	-	-
29th – 30th Aug	25	1	1	-	1
30th – 31st Aug	6	-	-	1	-
31st – 1st Sept	33	-	-	-	-
2nd – 3rd Oct	-	2	1	-	-
3rd – 4th Oct	-	-	-	-	-
4th – 5th Oct	-	-	-	-	-
5th – 6th Oct	-	-	-	-	-
6th – 7th Oct	5	-	-	-	-
7th – 8th Oct	-	-	-	-	-
8th – 9th Oct	2	-	-	-	-
9th – 10th Oct	-	-	-	-	-
10th – 11th Oct	-	-	1	-	-
Totals	**168**	**6**	**5**	**1**	**1**

All night's data combined – eighteen nights at 11.5 hours recording time per night = 207 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	168	6	5	1	1
Passes (per/hr)	**0.81**	**0.03**	**0.02**	**0.004**	**0.004**

T5 Feature

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
23rd – 24th Aug	4	-	-	-	-	-
24th- 25th Aug	9	10	4	-	-	-
25th – 26th Aug	15	38	44	-	1	-
26th – 27th Aug	10	10	2	-	1	-
27th – 28th Aug	11	14	115	-	4	-
28th – 29th Aug	5	7	4	-	-	-
29th – 30th Aug	30	15	44	-	-	-
30th – 31st Aug	18	18	15	1	-	2
31st – 1st Sept	14	1	-	-	1	-
2nd – 3rd Oct	-	-	-	-	-	-
3rd – 4th Oct	-	-	-	-	-	-
4th – 5th Oct	-	-	-	-	-	-
5th – 6th Oct	-	-	-	-	-	-
6th – 7th Oct	-	-	-	-	-	-
7th – 8th Oct	-	-	-	-	-	-
8th – 9th Oct	-	-	-	-	-	-
Totals	**116**	**113**	**228**	**1**	**7**	**2**

All night's data combined – eighteen nights at 11.5 hours recording time per night = 207 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR	PINA
Total Passes	116	113	228	1	7	2
Passes (per/hr)	**0.56**	**0.55**	**1.1**	**0.004**	**0.03**	**0.01**

T6

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
30th – 31st Aug	140	1	-	-	-
31st – 1st Sept	62	-	-	-	--
1st – 2nd Sept	180	1	5	-	7
2nd – 3rd Sept	19	4	3	2	-
3rd – 4th Sept	3	-	1	1	-
4th – 5th Sept	28	1	-	-	-
5th – 6th Sept	124	2	-	1	-
6th – 7th Sept	34	-	-	3	6
7th – 8th Sept	79	2	1	-	-
8th – 9th Sept	25	-	-	-	-
9th – 10th Sept	24	-	-	-	-
10th – 11th Sept	4	-	-	-	-
Totals	**722**	**11**	**10**	**7**	**13**

All night's data combined – twelve nights at 11.5 hours recording time per night = 138 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	722	11	10	7	13
Passes (per/hr)	**5.23**	**0.08**	**0.07**	**0.05**	**0.09**

T6 Feature

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
30th – 31st Aug	1	16	7	-	-
31st – 1st Sept	10	3	1	-	1
1st – 2nd Sept	26	35	40	-	7
2nd – 3rd Sept	1	12	15	1	5
3rd – 4th Sept	2	1	2	-	-
4th – 5th Sept	4	15	11	-	1
5th – 6th Sept	19	16	22	1	-
6th – 7th Sept	8	9	18	3	-
7th – 8th Sept	3	28	51	-	1
8th – 9th Sept	5	9	6	-	-
9th – 10th Sept	-	1	-	-	-
10th – 11th Sept	3	1	-	-	-
Totals	**82**	**146**	**173**	**5**	**15**

All night's data combined – twelve nights at 11.5 hours recording time per night = 138 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	82	146	173	5	15
Passes (per/hr)	**0.59**	**1.06**	**1.25**	**0.04**	**0.11**

T7

	NYLE	PIPI	PIPY	PLAUR
20th – 21st Sept	-	-	-	-
21st – 22nd Sept	-	-	-	-
22nd – 23rd Sept	-	-	-	-
23rd – 24th Sept	1	-	-	1
24th – 25th Sept	1	-	-	-
25th – 26th Sept	-	-	-	-
26th – 27th Sept	-	1	2	-
27th – 28th Sept	7	3	4	-
28th – 29th Sept	-	-	1	1
29th – 30th Sept	-	-	-	-
30th – 1st Oct	-	-	-	-
Totals	**9**	**4**	**7**	**2**

All night's data combined – eleven nights at 11.5 hours recording time per night = 126.5 hours recording

	NYLE	PIPI	PIPY	PLAUR
Total Passes	9	4	7	2
Passes (per/hr)	**0.07**	**0.03**	**0.06**	**0.02**

T7 Feature

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
20th – 21st Sept	-	2	1	1	-
21st – 22nd Sept	-	-	10	-	-
22nd – 23rd Sept	-	-	1	1	-
23rd – 24th Sept	1	-	-	-	-
24th – 25th Sept	-	7	1	-	1
25th – 26th Sept	-	-	3	-	-
26th – 27th Sept	-	7	65	1	-
27th – 28th Sept	12	372	87	2	4
28th – 29th Sept	-	50	47	-	9
29th – 30th Sept	-	40	213	2	-
30th – 1st Oct	1	12	54	3	-
Totals	**14**	**490**	**482**	**10**	**14**

All night's data combined – eleven nights at 11.5 hours recording time per night = 126.5 hours recording

	NYLE	PIPI	PIPY	Myotis spp	PLAUR
Total Passes	14	490	482	10	14
Passes (per/hr)	**0.11**	**3.87**	**3.81**	**0.08**	**0.11**

Appendix 3 – Photographs

Photo 1 – Anabat Express on a post at the proposed location of T1.

Photo 2 – Paired Anabat Express on a post at the habitat feature to the west of T1.

Photo 3 – SMZC static detector on a post at the proposed location of T2.

Photo 4 – Paired SMZC detector on a post at the habitat feature to the west of T2.

Photo 5 – SM4ZC detector on a post at the propose location of T3.

Photo 6 – Paired Anabat Express on a post at the habitat feature to the northwest of T3.

Photo 7 – An SM2Bat+ detector on a post at T4.

Photo 8 – An SM2Bat+ on a post at the habitat feature (stream) to the north of T4.

Photo 9 – An Anabat Express on a post at the proposed location of T5.

Photo 10 – A paired detector on a post overlooking the river/stream to the east of T5.

Photo 11 – An SM4ZC on a post at the location of T6.

Photo 12 – A paired SM4ZC at the stream to the west of T6.

Photo 13 – An Anabat Express detector on a post at the proposed location of T7.

Photo 14 – A paired Anabat Express detector unit on a fence post along the stream immediately to the west of T7.

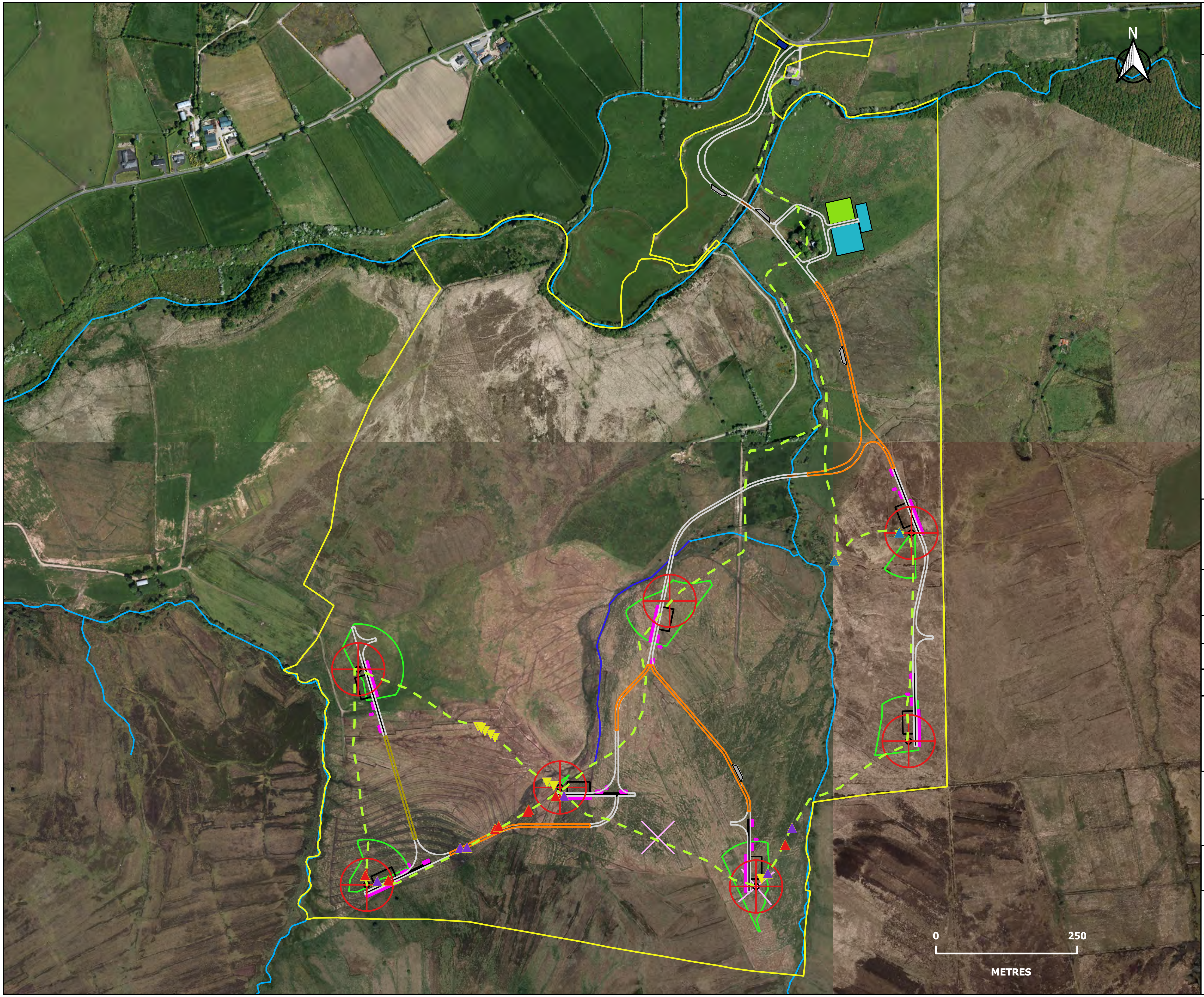
Photo 15 – Building A front view.

Photo 16 – Showing the emergence point, top-left corner of boarded-up window.

Photo 17 – Showing a closer view of the emergence point.

Photo 18 – Showing a screenshot of a bat emerging from the roost.

Appendix 4 – Figures



KEY

- LAND UNDER APPLICANT CONTROL
- TURBINE LOCATION
- PERMANENT CRANE HARDSTANDING AREA
- TEMPORARY CRANE HARDSTANDING AREA
- MICROSITING
- CUT OR FLOATED TRACK
- FLOATED TRACK
- EXCAVATED TRACK
- TEMPORARY PASSING BAY
- WATERCOURSE CROSSING
- METEOROLOGICAL CALIBRATION MAST LOCATION
- SIGNIFICANT WATERCOURSE
- MAIN DRAIN
- CONTROL BUILDING & SUBSTATION COMPOUND
- TEMPORARY CONSTRUCTION COMPOUND
- TEMPORARY ENABLING WORKS COMPOUND
- TRANSECT
- LEISLER'S BAT
- DAUBENTON'S BAT
- COMMON PIPISTRELLE
- SOPRANO PIPISTRELLE

SURVEYORS

Blackstaff Ecology

DRAWING NUMBER

COORDS: TM65 IRISH GRID

PURPOSE: PLANNING APPEAL

SCALE | ORIGINAL PLOT SIZE: A3

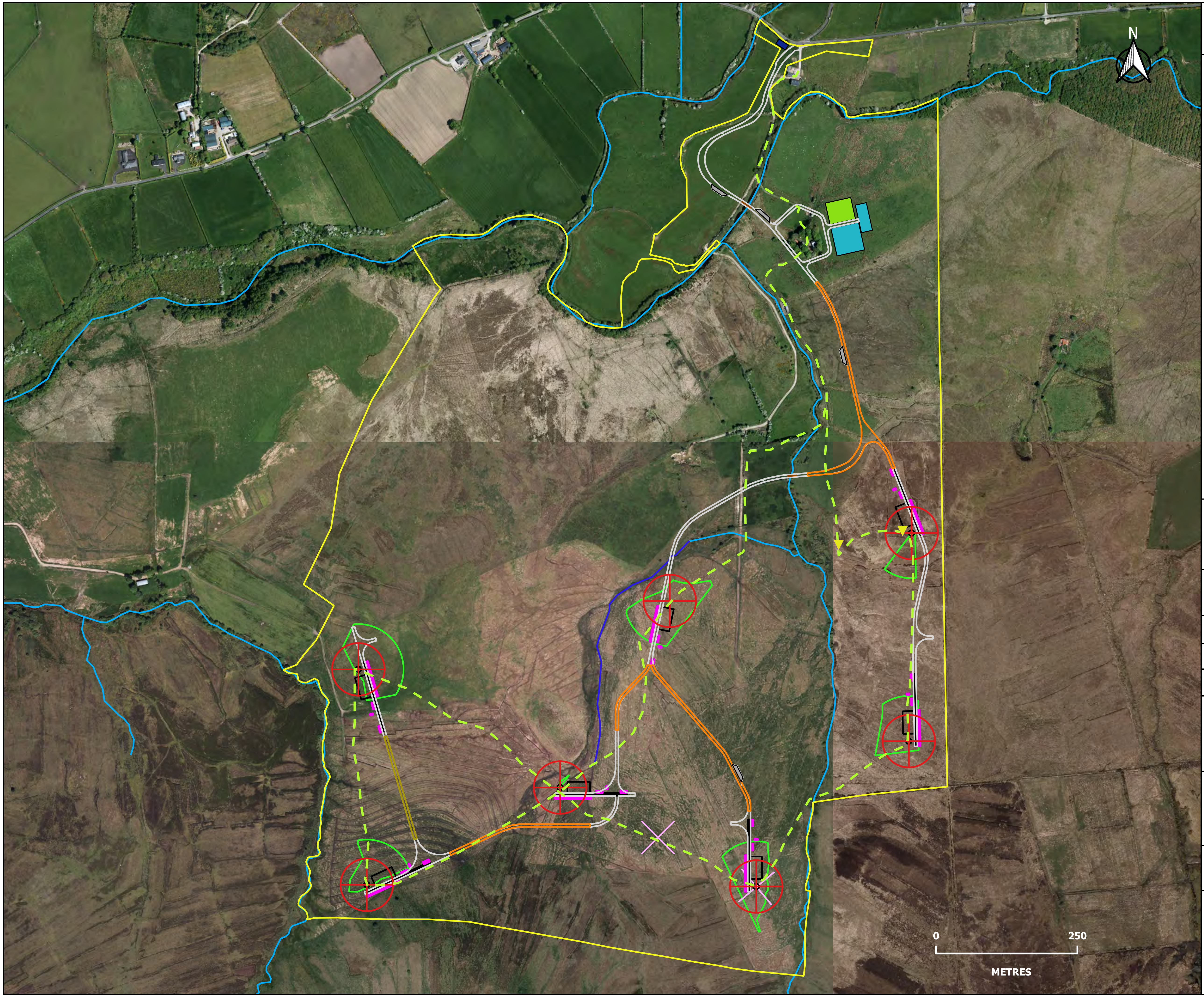
PROJECT TITLE

BARR CREGG WIND FARM

FIGURE 1
BAT TRANSECT ONE

CLIENT

res
BEAUFORT COURT, EGG FARM LANE,
KINGS LANGLEY, HERTS WD4 8LR.
TEL +44 (0) 1923 299200
FAX +44 (0) 1923 299299



KEY

- LAND UNDER APPLICANT CONTROL
- TURBINE LOCATION
- PERMANENT CRANE HARDSTANDING AREA
- TEMPORARY CRANE HARDSTANDING AREA
- MICROSITING
- CUT OR FLOATED TRACK
- FLOATED TRACK
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- TEMPORARY PASSING BAY
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- METEOROLOGICAL CALIBRATION MAST LOCATION
- SIGNIFICANT WATERCOURSE
- MAIN DRAIN
- CONTROL BUILDING & SUBSTATION COMPOUND
- TEMPORARY CONSTRUCTION COMPOUND
- TEMPORARY ENABLING WORKS COMPOUND
- TRANSECT
- LEISLER'S BAT

SURVEYORS

Blackstaff Ecology

DRAWING NUMBER

COORDS: TM65 IRISH GRID

PURPOSE: PLANNING APPEAL

SCALE

ORIGINAL PLOT SIZE: A3

PROJECT TITLE

BARR CREGG
WIND FARM

FIGURE 2
BAT TRANSECT TWO

CLIENT

res

BEAUFORT COURT, EGG FARM LANE, KINGS LANGLEY, HERTS WD4 8LR.
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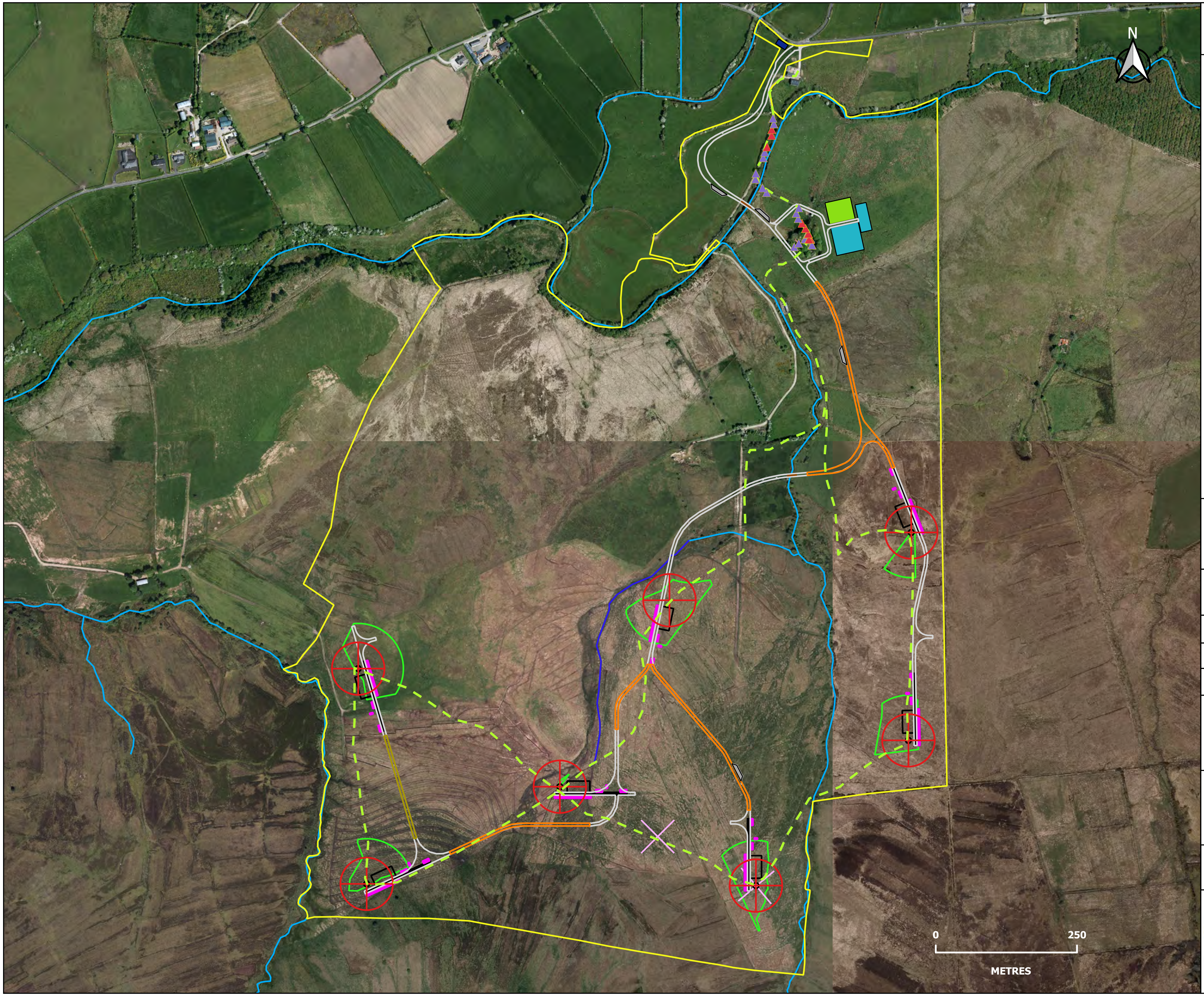

KEY

- LAND UNDER APPLICANT CONTROL
- TURBINE LOCATION
- PERMANENT CRANE HARDSTANDING AREA
- TEMPORARY CRANE HARDSTANDING AREA
- MICROSITING
- CUT OR FLOATED TRACK
- FLOATED TRACK
- EXCAVATED TRACK
- TEMPORARY PASSING BAY
- WATERCOURSE CROSSING
- METEOROLOGICAL CALIBRATION MAST LOCATION
- SIGNIFICANT WATERCOURSE
- MAIN DRAIN
- CONTROL BUILDING & SUBSTATION COMPOUND
- TEMPORARY CONSTRUCTION COMPOUND
- TEMPORARY ENABLING WORKS COMPOUND
- TRANSECT
- COMMON PIPISTRELLE
- SOPRANO PIPISTRELLE

SURVEYORS

Blackstaff Ecology

DRAWING NUMBER

COORDS	TM65 IRISH GRID
PURPOSE	PLANNING APPEAL
SCALE	ORIGINAL PLOT SIZE A3

PROJECT TITLE

BARR CREGG
WIND FARM

FIGURE 3
BAT TRANSECT THREE

CLIENT

res
BEAUFORT COURT, EGG FARM LANE, KINGS LANGLEY, HERTS WD4 8LR.
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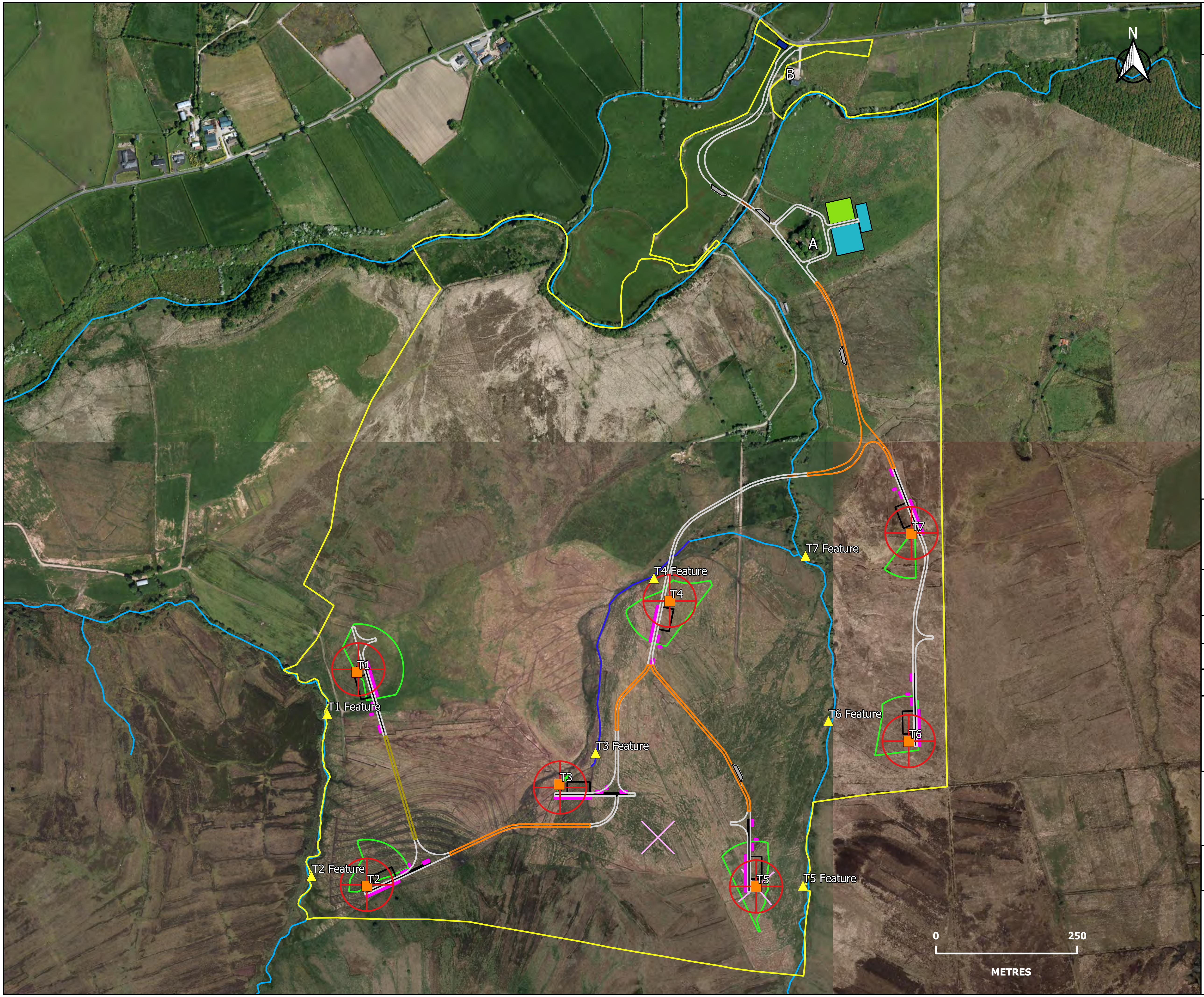

KEY

- LAND UNDER APPLICANT CONTROL
- TURBINE LOCATION
- PERMANENT CRANE HARDSTANDING AREA
- TEMPORARY CRANE HARDSTANDING AREA
- MICROSITING
- CUT OR FLOATED TRACK
- FLOATED TRACK
- EXCAVATED TRACK
- TEMPORARY PASSING BAY
- WATERCOURSE CROSSING
- METEOROLOGICAL CALIBRATION MAST LOCATION
- SIGNIFICANT WATERCOURSE
- MAIN DRAIN
- CONTROL BUILDING & SUBSTATION COMPOUND
- TEMPORARY CONSTRUCTION COMPOUND
- TEMPORARY ENABLING WORKS COMPOUND
- TURBINE MONITORING LOCATION
- FEATURE MONITORING LOCATION

BUILDINGS (A & B)

SURVEYORS

Blackstaff Ecology

DRAWING NUMBER

COORDS	TM65 IRISH GRID
PURPOSE	PLANNING APPEAL
SCALE	ORIGINAL PLOT SIZE A3

PROJECT TITLE

BARR CREGG
WIND FARM

FIGURE 4
STATIC MONITORING LOCATIONS

CLIENT

BEAUFORT COURT, EGG FARM LANE, KINGS LANGLEY, HERTS WD4 8LR.
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Bird Survey Report

9 Ornithology – Technical Report

Introduction

9.1 This technical report aims to provide clarification by addressing the issues recently raised within NIEA NED Statement of Case and the proposed Reasons for Refusal that relates to birds. These are dealt with in paragraphs 9.8 and 9.9 below and Table 3 within Appendix 9.1. For ease of reference these clarifications have been added to the previously submitted report summarising and assessing the relevant information for ornithology in relation to the proposal to develop Barr Cregg Wind Farm.

Assessment of Impacts

9.2 The possible impacts of the proposal on ornithological issues have been assessed in sections 9.37-9.48 of the ES 2012. Possible impacts have been assessed in line with approved methodologies and criteria. In most cases impacts have been assessed as negligible. Where significant impacts have been identified then appropriate mitigation measures have been proposed and the resulting residual impacts have been assessed as negligible. No significant cumulative or transboundary impacts have been identified in relation to the proposal.

9.3 Providing that the mitigation measures detailed in section 9.45 of the ES are implemented then NIEA/NH find that there are no significant ornithological issues in relation to the proposal. NIEA, Natural Environment Division (NED) also considers that measures proposed in the habitat management plan (oHRMP) *are likely to deliver improved habitat for snipe and several other bird species of conservation concern (skylark, meadow pipit, stonechat and reed bunting).* **In addition providing that the mitigation measures are implemented, RSPB have no objection to the proposal.**

Update to Baseline for Breeding Birds

9.4 The **baseline** for breeding birds for the Barr Cregg Wind Farm site has been updated by way of four Moorland Bird Survey (MBS) visits completed during April to early July 2018. The surveys were carried out in line with the current SNH guidance for moorland breeding birds[1]. The objective of the breeding bird surveys was to provide updated information, especially for those species which are expected to benefit from the proposed habitat management and enhancement measures (oHRMP). Details of the four MBS visits and a summary of the updated breeding bird community are given in the Appendices to this report.

9.5 The updated baseline indicates that the breeding bird community found within the Barr Cregg Wind Farm site is overall very similar to that found by the original baseline surveys. The most significant change is that snipe is not now recorded as a breeding species within the site and this is likely due to deterioration in habitat quality for this species, in particular drying out of the bog areas due to drainage and likely also a reduction in vegetation quality due to high stocking densities of sheep (see also

[1] *Recommended bird survey methods to inform impact assessment of onshore wind farms* (SNH Published Guidance, May 2014)

comments included within ornithology section of the OHRMP). It is possible that snipe still breed within the buffer area and / or within the wider surrounding local area (within 1 – 2 km) but this could not be confirmed.

9.6 Apart from the loss of snipe as a breeding bird within the site, the overall diversity / species list for the breeding bird community is very similar to that found by the original baseline surveys. *Importantly (with the exception of snipe) all those breeding bird species that are expected to benefit from the habitat enhancement measures proposed by the oHMP are confirmed as still present within the site.* If snipe are still present in the immediately surrounding local area (this has not been confirmed but is certainly possible based on the habitats present) then it is possible that they could re-occupy territories within the Barr Cregg Wind Farm site following implementation of the habitat enhancement measures.

9.7 Quail (recorded by the original baseline surveys) was not found by the updated surveys, however this is not an unexpected finding as this species is a very erratic summer migrant to Northern Ireland and is not expected to be regularly occurring within the site. Two “new” species (grey wagtail and pied wagtail) were found by the updated surveys - both species were located towards the periphery of the site. Otherwise the species list for breeding birds is unchanged from the original baseline. The numbers of breeding pairs of each species found by the updated surveys are also generally comparable to those found by the original baseline surveys – some changes in numbers were found for some species but in most cases these are relatively minor and in general are likely to fall within expected survey tolerances and also within natural background variation. The reduction in size of the sand martin colony is more significant and is due to a reduction in the size of the exposed sand-cliff in which the birds can make their burrows).

Raptor Sightings

9.8 The vantage point surveys carried out for the ES 2012 found low activity by raptors (especially those species that would be of conservation concern) and there is currently no particular reason to suspect that raptor activity is likely to have changed significantly from that described in the ES – importantly, the updated MBS surveys have confirmed that no raptor species are currently breeding within the site or 500 m buffer area and there have been no relevant habitat changes in the immediate wider surrounding area. Because of this (and also because the vantage point survey results would not usefully inform the oHRMP) it was not necessary to update these surveys.

9.9 Although the vantage point surveys have not been updated, the updated MBS surveys involved a total of 25 survey hours on the site and although raptors are not the primary target species for this type of survey it is still possible to gain a general impression of raptor activity within the survey area. Sightings of raptors made during the course of the updated MBS surveys are summarized in Appendix 9.1 – Table 3. In view of the survey effort and the other factors discussed above (paragraph 9.9) then the sightings would indicate that raptor activity has not changed significantly from that described in the ES 2012.

Conclusions

9.10 Following a review of all the relevant information in relation to the proposal to develop Barr Cregg Wind Farm it is concluded that:

- providing the proposed mitigation measures are implemented then there are **no significant ornithological issues in relation to the proposal;**
- providing the oHMP is implemented then **the proposal is likely to deliver benefits (by way of improved habitat) for snipe and several other bird species of conservation concern (skylark, meadow pipit, stonechat and reed bunting);**
- **The above conclusions are not altered by the findings of the updated breeding bird baseline surveys**
- There has been no suggestion of any significant changes in raptor activity compared to that described by the ES 2012.

Appendix 9.1

Table 1 - Details of MBS Visits Completed in 2018

Visit No.	Visit Date	Time Start	Duration (hours)	Observer	Remarks
1	19th April	0830	6	DS	Partial cloud, sunny spells, light S breeze
2	14th May	0930	7	DS	Cloudy, humid, light SW breeze or calm, patchy light drizzle
3	18th June	0900	6	DS	Partial cloud, warm sunny spells, light SW breeze
4	9th July	0830	6	DS	Partial cloud, warm sunny spells, light S breeze

Table 2 - Updated Baseline for Breeding Bird Community within the Barr Cregg Wind Farm site (and Comparison with the Original Baseline)

Species	Updated Baseline (2018)	Original Baseline (2011)	Remarks
Quail	**0**	1	Possible breeding in 2011 (not confirmed
Mallard	**1**	1	Pairs
Snipe	**0**	2	Not confirmed in 2018
Cuckoo	**1-2**	1	Singing males
Wood Pigeon	**2**	2	Pairs
Sand Martin	**20**	50	Count of burrows
Swallow	**1**	2	Pairs
Skylark	**12-14**	11	Singing males / pairs
Meadow pipit	**14-16**	12	Singing males / pairs
Wren	**5**	3	Singing males / pairs
Blue tit	**1**	1	Pairs
Great tit	**1**	1	Pairs
Coal tit	**1**	1	Pairs
Robin	**2**	3	Singing males / pairs
Dunnock	**1**	1	Singing males / pairs
Blackbird	**2**	2	Singing males / pairs
Mistle thrush	**1**	1	Singing males / pairs
Stonechat	**3**	1	Singing males / pairs
Grey wagtail	**1**	0	Singing males / pairs
Pied wagtail	**1**	0	Singing males / pairs
Willow warbler	**6**	7	Singing males / pairs
Grasshopper warbler	**1**	2	Singing males / pairs
Blackcap	**1**	1	Singing males / pairs
Goldcrest	**1**	1	Singing males / pairs
Chaffinch	**5**	7	Singing males / pairs
Redpoll	**3-4**	2	Singing males / pairs
Siskin	**1**	1	Singing males / pairs
Linnet	**2**	1	Singing males / pairs
Magpie	**1**	1	Pairs
Hooded crow	**2**	1	Nests
Reed bunting	**4**	4	Singing males / pairs

Table 3 – Summary of Raptor Sightings Made During the Updated MBS Visits (2018)

Species	No. of Sightings	Details
Hen harrier	**0**	-
Peregrine	**0**	-
Merlin	**1**	Female bird in travelling flight, 19th April 2018 (on this date it is possible that this could be a late wintering or passage bird)
Kestrel	**1**	Foraging bird, 19th April
Buzzard	**3**	Two birds circling, 19th April; one bird foraging 18th June; one bird circling, 9th July